Covering the TI99/4A, the Myarc 9640 and compatibles

MICROpendium

Volume 4 Number 8 September 1987 $1.50

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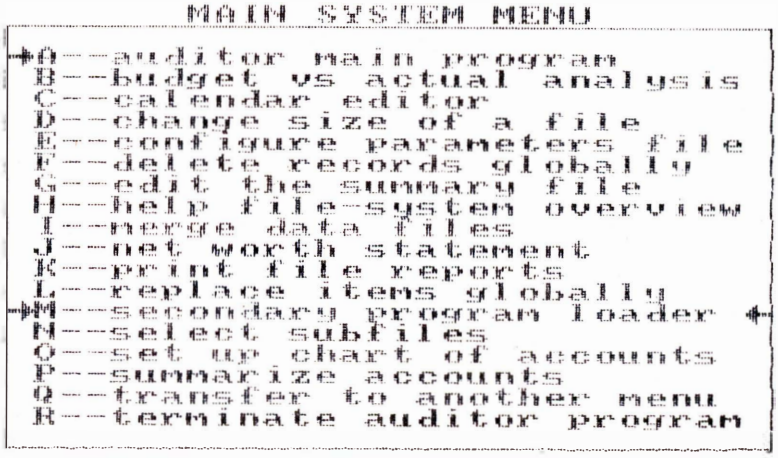
Also: EFONT character set adaptation
See Page 27



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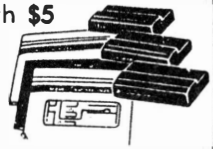

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- Comparison of nine data bases
- Understanding TI's disk operating system
- Review of Font Writer

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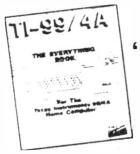

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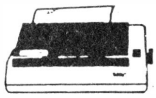

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Price rises with costs

The price of a subscription to MICROpendium is going to increase $3 per year starting Nov. 1. The current base subscription price of $17 for third class delivery will go to $20 and the the price of first class delivery will go to $25.25. This is the third time in the past four years and eight months that the subscription price of MICROpendium has increased. It's necessary because of increases in printing costs, accumulated bad debts from some former advertisers and vendors and to offset declining advertising revenues. (We may publish the names of the advertisers who won't pay their bills just to get some satisfaction.)

Also, the cover price and bulk purchases prices will increase in November. The cover price will increase from $1.50 to $2 and the bulk purchase cost will increase from 75 cents to $1 per copy. The minimum bulk copy order is 7 copies per month. Back issues of MICROpendium will remain available at $1.50 per copy.

Readers may renew their current subscriptions regardless of the month they expire at the old rates through Nov. 1. However, we ask that renewals at the old rates be for one year only.

TI USER GROUPS

We continue to receive additional listings and updates on TI users groups in this and other countries. We didn't have room for them this issue, but plan to keep printing them as space becomes available.

GENEVE COLUMN DEBUTS

As promised, Mike Dodd has started his Geneve column this issue. We have received word that the DOS is being tested, complete except for batch commands, and assuming no major errors should be completed sometime during September or early October. Some software contracts have been recently renegotiated, we hear.

My-Word and Multiplan are said to be 100 percent complete, Multiplan having as much speed as the IBM version and as much memory for spreadsheets as the way TI wrote it would allow — 56K. Also, some bugs are gone — the tabbing key can now be used between fields. My-Art is also complete.

Ten of Myarc's hard-and-floppy-disk controllers are being beta-tested with one of the 10's beta-tests 70 percent complete. Production is expected to start about Oct. 1 and shipments to dealers are expected to begin in mid-October. The controller handles single and double-sided diskettes and features a re-engineered card with newly engineered gate array. The card supports a three-megabyte streamer-tape backup. The disk manager with the hard-and-floppy disk controller board is designed with the same look and ''feel'' as Myarc's Disk Manager III

Myarc plans a one-time direct mailing of software (Multiplan, MDOS, My-Word, Advanced BASIC and Pascal) to everyone from whom it received a warranty registration. In addition, documentation addenda (such as information on My-Word where it differs from the TI-Writer manual) will also be made available. This mailout is scheduled for late October. In the meantime, updated software (DOS, My-Word and Multiplan) is available from dealers, or the customer can send a self-addressed envelope and initialized blank disks and postage for each of the three programs desired to Myarc. The envelope should be large enough to accomodate 8 ½ x 11 addendum sheets.

SPACE IS AT A PREMIUM

You'll notice that we've got only 40 pages this month. We needed to cut costs a bit. Next month we'll be at 48 again and should be for the remainder of the year. What we may do the next time we have 40 pages is set the type in a smaller size and run the programs in condensed type rather than Elite. Reducing the type size and leading by one point (we use 10 point type on 12 point leading) would have the effect of ''adding'' 1-2 pages to a 40-page edition. We would then have been able to include an additional two pages of User Notes. Printing program listings in a condensed font would have a similar effect. We may try it just to see what it looks like.

—JK

Reviewed in MICROpendium

1984

February: B-1 Nuclear Bomber, Tandon TM-100 Disk Drive, Void, Beanstalk Adventure, Microsurgeon, On Gaming, Database 500.
March: Star Trek, Escape From Balthazar, Garkon's Getaway, Sky Diver, Mail-Call, Prowriter 8510 Printer.
April: Monthly Budget$ Master, Budget Master, Home Budget, Thief, Donkey Kong, Khe Sanh.
May: Companion Word Processor, Q*Bert, Mad-Dog I & II, Programs for the TI Home Computer.
June: Creative Expressions Accounts Receivable/Accounts Payable, CDC 9409 Disk Drive, Starship Concord, Lost Treasure of the Aztec, ASW Tactics II.
July: Theon Raiders, Introduction to Assembly Language for the TI Home Computer, Game of Wit, Pole Position
August: TE-1200, Tower, Galactic Battle, Galaxy
September: Wycove Forth, 99/4 Auto Spell-Check, QUICKCOPYer, Wizard's Dominion, Anchor Automation Mk XII Modem
October: Killer Caterpillar, ZORK I, Defender
November: 9900 Disk Controller Card/Manager, Super Bugger, Transtar 120S printer, Floppy-Copy, Data Base-X
December: Gravity Master, Data Base Manager System, Learning 99/4A Assembly Language Programming

1985

January: Super Sketch, Foundation Computing 128K Card, PTERM-99, TI-Runner
February: Super Extended BASIC, Beginning Assembly Language for the TI, ZORK II
March: Morning Star Software CP/M Card, WDS/100 Winchester Disk Drive, Sketch Mate, BMC Color Monitor
April: 9900 Micro Expansion System, Disk+Aid, Gemini 10X-15X
May: Character Sets and Graphics Design, Draw 'N Plot
June: GRAPHX, DATA BASE I
July: Acorn 99, Advanced Diagnostics
August: Model Dow-4 Gazelle, TI-Artist, PC-KEYS, Not-Polyoptics' Bankroll
September: Midnite Mason, Myarc 32K/128K Card, GRAPHX Companion
October: 4A/TALK, Extende BASIC II Plus, XB Detective, Console Writer 2.a
November: Foundation Z80A/80-column cards, 9900BASIC, Adventure Editor
December: Display Enhancement Package, Triple Tech

1986

January: BITMAC, Starcross
February: Night Mission, Peripheral Diagnostic Module, BA-Writer
March: Super Duper, Tunnels of Doom Editor, Business Graphs 99
April: U.S. Open Tennis, PRBASE
May: 4A Flyer, GRAM Kracker, Artist's Companion
June: Myarc Disk Controller Card, Maximem
July: Horizon RAMdisk, Old Dark Caves, Funlwriter, TI99/4A Macro Assembler
August: JOYPAINT 99, GPL Assembler, TI99/4A Intern, GPL Linker
September: Mechatronic 128K Card
October: TI-Forth Utilities, CorComp Memory Plus
November: Submarine Commander, PEP, MAX-
December: GK Utility I and II and GRAM Packer, X-10 Powerhouse, RAVE 99/101.

1987

January: MG DISkASSEMBLER, Myarc XBII
February: TI-Tax, Mechatronic Mouse
March: Wycove Forth version 3.0, DIJIT Systems RGB Conversion Kit, Spad XIII Flight Simulator
April: Geneve 9640, Disk Utilities
May: QS-Solitaire, Geneve 9640 (Part 2), Technical Drive, Console Calc
June: Character Sets and Graphic Design III, Writerease Ver. 1.1, 4A DOS, Prescan_It
July: Junkman Junior, Avatex 1200/1200hc modem, Bubble Plane
August: Prostick, The Brain, Rocketman, Menu Ver. 6.3

Feedback

Unknown moral

Ever hear of "Exceltec," located in Lubbock, Texas? Well, they deserve a plug!

I bought their Extended BASIC through "Bits & Chips." It didn't work right from the start. My daughter, Norma, was trying to use it and had little success. I tried it on my setup and it dumped the CorComp RAM card.

I sent it to Exceltec with an enclosed letter of explanation. They kept it for a month and returned it in the same box with this letter:

"In response to your post paid TI EXTENDED BASIC CARTRIDGE for repair. There is no guarantee and it was mailed to you."

I thought, "What to do?" So I took a chance and opened the case, peered at the board, and lo and behold! There was what I would call an open "solder jumper." I soldered a wire in it and it seems O.K. Don't know what the moral is, but that's my story.

Frederick Layton
Oakland, California

Cures for Geneve's recurring ailments

I have noted some recurrent problems with Myarc's Geneve computer, and I present here some of the "cures" for such problems.

First, some people are getting "garbage" when they type with their enhanced keyboard. This garbage is 99.99 percent of the time caused by the simple reason that the keyboard mode is set in "AT". For the Geneve, the keyboard MUST always be set in "XT" mode.

Also, another problem is with the clock. Some software, for reasons unknown, causes the clock to enter a "test" mode. In this test mode, the time scrolls through extremely quickly, thus allowing the maker to see if the clock is changing days correctly, or making sure it runs on a 24 hour schedule or whatever. Unfortunately, when in "test" mode, no data whatsoever can be saved: not to physical drives, and sometimes not to RAMdisks. To diagnose it, check a program that uses the clock (e.g. MyWord) and see if the clock is continually changing the time. If it is, then it is in test mode. Also, you won't be able to save anything to disk. But there is a simple "cure" to reset the clock out of test mode—perform the following CALL LOAD in BASIC with either Editor/Assembler or Mini-Memory loaded or in Extended BASIC (TI or 2.11):

CALL LOAD (-32752,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0)

That's 16 zeros.

Now, your clock is set to the "beginning of time" and can be reset with the program written by J. Peter Hoddie.

Bret J. Musser
Warren, New Jersey

Clarification issued

In the August issue on page 35, a program of mine, RAM/LOADER appeared in the Fairware section and I feel the need to clarify a few things.

First, the program is not Fairware. It is placed in the public domain, as the documentation states. Since the program was patterned around use with John A. Johnson's CALL MENU ROS for the Horizon RAMdisk, which is public domain, I felt that RAM/LOADER should be also. Second, there are a few features of RAM/LOADER which MICROpendium failed to mention that I feel users should be aware of. The ability to select eight color choices using the space bar is available to use in either command mode of Extended BASIC, or in running a program. In fact, the routine on page 45 listed under User Notes in the same issue is the routine I included in RAM/LOADER. Also, since RAM/LOADER runs in 40 column mode, the descriptions on the menu may be as long as 33 characters each in length. This gives the user much more flexibility in what appears on the screen. You may enter a description, comment, title or simply just the program name if you wish.

As MICROpendium stated, READ/DV80, a program by J. Peter Hoddie, is included to read the documentation file. Thanks to J. Peter Hoddie and Barry Traver of Genial TRAVelER for their permission to include it with RAM/LOADER.

Before version 6 of CALL MENU, RAM/LOADER had more merit with John's ROS due to a limitation of CALL MENU not being able to load XB programs. This restriction of CALL MENU has been eliminated and creative users will still find value in using RAM/LOADER with a RAMdisk, or without.

Steven D. Mehr
Thousand Oaks, California

A poor excuse . . .

I have been an avid reader and supporter of MICROpendum since it first appeared. I'm sure you have heard the comment "A poor excuse is better than none." I find your comments in the August issue explaining the "First Use Method" filing system almost humorous.

Over the years several of my letters were never answered. I excused the lack of answers as the limitations of a part-time venture, or the information I sent was not worth publishing or required no return comment. I even dismissed the lack of a reply for the reason of not including an SASE. My letters could have even been lost in the canyon south of Amarillo by the postal service.

To insure that information and suggestions reached you, I have included them with my subscription renewals. If I understand your F.U.M. correctly, I should have included my renewal and check. You would have taken care of all correspondence first and then entered my subcription. I have entered FUM in my computer and it came up with a better description of your filing system, "F.U.Mess" filing system.

Kent Sheets
Curtice, Ohio

Aw, c'mon, we printed a letter from you in June. And actually, we try to take care of anything anyone sends money for first thing, regardless. Any or all of your reasons for not getting answers could be correct, plus some you didn't list.—Ed.

The Feedback column is a reader forum. The editor will condense excessively lengthy submissions if necessary. We ask that writers limit themselves to one subject per submission. Our only requirement is that submissions be of interest to those using the TI99/4A home computer or compatibles. Send items to MICROpendium Feedback, PO. Box 1343, Round Rock. TX 78680.

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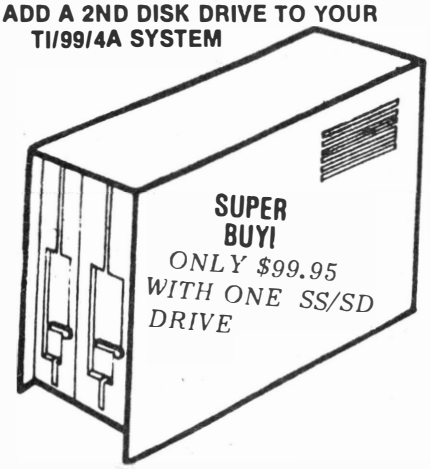

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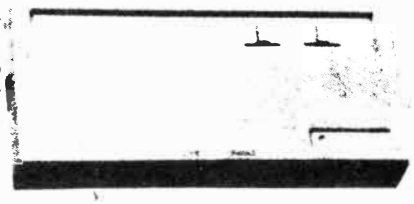

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BASIC

Simple file processing

By REGENA

When you are programming, the most common use of the cassette or diskette system is to save or load a program. The commands are SAVE CS1 to save the existing program on cassette and OLD CS1 to load a program from cassette. The disk commands are SAVE DSK1.title and OLD DSK1.title where "title" is the name of the program.

Now let's say you want to run a program and within that program you want to save some information or load some information previously saved. Or perhaps you have an early TI program (such as my Name and Address File in my book, *COMPUTE!'s Programmer's Reference Guide to the TI-99/4A*) that uses cassette and you want to change it to disk operation. This month I'll discuss how to do this.

First, I am going to refer you to the User's Manual that came with your TI computer (the green and yellow book). The section on "File Processing" tells about the OPEN statement with various options, then the PRINT # and INPUT # statements that are used to save and retrieve data. You can read the information there and experiment a little. I'll give you a few simple samples to get you going on your own programming.

For illustration purposes, this program will simply work with names—you can type in a list of names, then save it and later retrieve it and print the list.

First you will probably want a menu screen to determine what your user wants to do. After your title screen, you can use a program segment like lines 100-260 of the program printed at the end of this article.

The choices are printed on the screen, then the user presses a key. The key must be 1, 2, 3, 4 or 5, and the program will then branch appropriately. I have used ON-GOSUB to go to a particular subroutine then return to this section of code. Line 260 then returns to Line 150, which starts the main menu screen again.

Line 120 is a DIMension statement to allow for 100 names in this example. If the names are short you may probably use more. I have used an array NAME$() to store the names so the computer has all the names in memory in case you want to manipulate them or alphabetize them. Line 130 sets the LIMIT to 100 for the number of names allowed. Line 140 is not necessary in TI BASIC but is in other versions of BASIC. When you first RUN the program, the value of N needs to be zero for the number of names in the computer.

If "5" is chosen, the program ends and all data is lost. It might be wise to give the user a second chance, just in case the "5" was an error. You could use lines 5000-5110 of the program for the subroutine to end the program.

Lines 5000-5020 print the warning message about ending the program. Lines 5030-5050 print a choice whether to return to the main menu screen (and NOT quit) or really to end the program. Lines 5060-5080 receive the key pressed. If a "1" is pressed, the program returns to the main menu screen. If a "2" is pressed, the program branches to Line 5100, which prints an ending message, then the program ends.

The first time the program is used, you will want to enter names. The variable N is the number of names entered, and NAME$() is the name. The procedure to receive the names is in lines 1000-1200.

Lines 1000-1040 print the instructions. The user needs to type in a name, then press ENTER. If the user is finished entering names, when the prompt appears just the ENTER key should be pressed without typing anything. Line 1050 keeps track of how many names have been entered. Line 1060 makes sure the number of names entered is less than the limit. I just used 100 as the limit here, but you can change it in your program. Simply change the DIMension statement and the next line that defines LIMIT. If you are entering long names or more than just names you might not be able to use as many as 100. With short names there is room for more than 100. If you have a lot of information, you can save lists in several different files, running the program once for each category. Lines 1070-1150 offer a short explanation about the limit.

Lines 1160-1170 receive the input. Line 1180 checks to see if just the ENTER key was pressed (for the null string). If a name was entered, then the program returns for the next name. If a name is not entered, the program returns to the main menu screen.

The next step is to save information, Option 3 of the main menu screen. This procedure starts at Line 2000. I am going to offer you a way to ask if the user wants to use cassette or diskette. If the user wants diskette storage, then the name of the file will also need to be entered. Since this process is the same for saving and loading information, it is in the subroutine starting at Line 500.

Line 2030 uses PRINT #1 to save something on device #1. The variable N is the number of names. Lines 2050-2080 then print the names on the screen and save the names in a file. Line 2090 closes the device. If you use disk, the red light on the disk drive will blink, indicating the disk drive is saving information. If you use cassette, you will hear tones indicating that the cassette recorder is recording. These tones sound different from the tones you hear when you are saving a program. The cassette instructions appear on the screen similar to saving a program. You do not have to print the information to the screen, but I put that line (Line 2060) in so you could see something happening as your data is being saved. Line 2100 returns to the main screen.

The section to load information is very similar to the saving procedure. The subroutine to choose cassette or diskette is called first, then Line 3020 uses D$ in the OPEN statement. Line 3020 matches the OPEN statement of Line 2020 in all parameters except Line 3020 is INPUT and Line 2020 is OUTPUT.

Line 3030 reads from the stored data the variable N, which is the number of names. Lines 3050-3080 then read N number of names and place them in the NAME$() array. Again, I also printed the information on the screen as the computer is retrieving information.

Line 3090 closes the device, then Line 3100 returns to the main menu screen.

Once information is in the computer you need to do something with it. The fourth option of the main menu screen simply prints the names in a list (see lines 4000-4080).

If we did not print information on the screen as data was being

(See Page 12)

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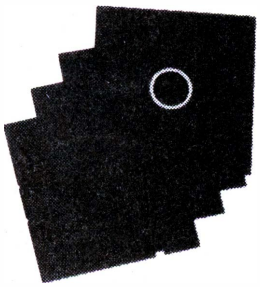

BASIC—

(Continued from Page 10)

loaded (Line 3070), you would not see any evidence that the information was being loaded. This Option 4 would then show the list of names in the computer.

After you have loaded names or printed names, you may then add more names. The N value will still indicate the total number of names in the computer.

This is a "bare bones" sample program for saving names. You may want to add a section to edit existing names. You may also want to add a section to alphabetize the names (perhaps a subroutine that you can call before you SAVE or PRINT the names). You can adapt the program to ask for more information than just names. For example, three of my sons and my two daughters played baseball and softball this summer. I could write a program to keep track of their game statistics, perhaps saving game number, at bats, hits, home runs, walks and batting averages. Each child's name would be a different file name on the disk or different cassette. The PRINT # and INPUT # statements would need to be changed to save or load more than one item, and I would probably add a section to do the calculations.

Of course, your program can become even more complex. If you want to save several items, you can use a statement such as PRINT #1:NAMES(C),ADDRESS$(C),PHONE$(C),AGE(C),DAY(C) However, it is usually more efficient to combine all the items into one string to save. Then when you load the information you need to take apart that string (using SEG$ and perhaps POS) to get the separate pieces of information.

Read the User's Manual to learn more about the options in the OPEN statement, then go ahead and adapt this program to your own needs. I hope this sample is understandable enough that you can customize it for the information you need.

File Processing Program

```
100 REM FILE PROCESSING
110 REM SAMPLE—NAMES
120 DIM NAME$(100)
130 LIMIT=100
140 N=0
150 CALL CLEAR
160 PRINT "CHOOSE:"
170 PRINT :"1  ADD NAMES"
180 PRINT :"2  SAVE NAMES"
190 PRINT :"3  LOAD NAMES"
200 PRINT :"4  PRINT NAMES"
210 PRINT :"5  QUIT PROGRAM"
220 CALL KEY(0,K,S)
230 IF (K<49)+(K>53)THEN 220
240 CALL CLEAR
250 ON K-48 GOSUB 1000,2000,3000,4000,5000
260 GOTO 150
480 REM
490 REM SUBROUTINE TO CHOOSE
500 PRINT :"CHOOSE:"
510 PRINT :"1  CASSETTE"
520 PRINT :"2  DISKETTE"
530 CALL KEY(0,K,S)
540 IF K=50 THEN 580
550 IF K<>49 THEN 530
560 D$="CS1"
570 GOTO 640
580 PRINT :"ENTER TITLE FOR NAMES"
590 PRINT "(FILE NAME)."
600 INPUT TITLE$
610 IF LEN(TITLE$)<9 THEN 630
620 TITLE$=SEG$(TITLE$,1,8)
630 D$="DSK1."&TITLE$
640 PRINT
650 RETURN
660 REM
1000 PRINT "TYPE A NAME"
1010 PRINT "THEN PRESS <ENTER>."
1020 PRINT :"TO END THE LIST, SIMPLY"
1030 PRINT "PRESS <ENTER>."
1040 PRINT : :
1050 N=N+1
1060 IF N<=LIMIT THEN 1160
1065 N=N-1
1070 PRINT "YOU HAVE REACHED THE LIMIT"
1080 PRINT "OF NAMES THAT MAY BE"
```

(See Page 32)

c99

Writing variable names

By CHARLES E. KIRKWOOD JR.

Variable names in c99 consist of letters, and digits. The name must begin with a letter and may be any length, but c99 only recognizes the first six characters. Usually, I write my variable names as short as possible and so that they still have a meaning in the program. Don't do like a young fellow I once knew. He used girls' names as his variable names. They may have had a meaning for him personally, but not to the program.

The statements **a=getchar();**, **a=putchar(a);**, **b=putchar(10);**, and **b=putchar(12);** from the previous article are all functions from the CSUP (compiler support library) to do specific things; i.e., input a character from the keyboard, print a character on the screen, go to the beginning of the next line on the screen (carriage return), and clear the screen.

Just to input a character and print it out is not much of a program. We must be able to do some type of manipulation. Let us now consider the **if** and **else** blocks. The general form is:

```
if (condition)
{
  statement 1;
  statement 2;
  statement 3;
}
else
{
  statement 4;
  statement 5;
}
```

If the **condition** above is **TRUE**, statements 1, 2, and 3 are executed and statements 4 and 5 are skipped. If the **condition** is **FALSE**, statements 1, 2, and 3 are skipped, and statements 4 and 5 are executed. The **else** block is optional; it may be omitted. In that case, statements 1, 2, and 3 are executed only if the **condition** is **TRUE**. In Extended BASIC, the number of statements included in the **if, else** is limited; however, this is not true in c99. Any number of statements can be included in each block. If there is only one statement within the block, the braces are not required.

The relational operators for the condition are == (equal to), != (not equal to), < (less than), <= (less than or equal to), > (greater than), >= (greater than or equal to).

Alphabetic characters are considered ascending from A to Z and descending from Z to A. Note that the ASCII number for A is 65, B is 66, ... , Z is 90. For a better understanding of the **if** and **else** blocks, take a disk in which you have stored **EDIT1**, **ASSM1**, **ASSM2**, **C99C**, **C99D**, **C99E**, and **CSUP** and copy the given examples, compile, asemble and execute them. Make up several data sets for each example in order to test each situation.

Example 1: Two uppercase alphabetic characters are input from the keyboard. Write a program to print out the lesser of the two. That is, if A and B are input in that order, A would be printed out. If B and A are input in that order, A would still be printed out. If the characters are the same, print out either one.

```
int a,b,c;
main()
{
  a=getchar();
  b=getchar();
  c=putchar(10);
  if(a<B)
    a=putchar(a);
  else
    b=putchar(b);
}
```

There are times in which we might want a prompt prior to typing in data or some identifying statements with the answers. The function **puts("character string");** will now be introduced in an example along with the **if**, **if else**, and **else** blocks. The **character string** can be any group of characters within quotation marks. They will be printed on the screen; e.g., **puts("John Doe");** will print **John Doe.**

Example 2: Rewrite Example 1 with an input prompt and identifying output. In this example, determine the lesser of the two input characters and also identify them if they are the same.

```
int a,b,c;
main()
{
  puts("TYPE TWO CAPITAL LETTERS");
  c=putchar(10);
  a=getchar();
  b=getchar();
  c=putchar(10);
  if(a<b)
  {
    a=putchar(a);
    puts(" comes before ");
    b=putchar(b);
  }
  else if (a>b)
  {
    b=putchar(b);
    puts(" comes before ");
    a=putchar(a);
  }
  else
  {
    puts("both are ");
    a=putchar(a);
  }
}
```

Notice the braces at the beginning of the **main()** function (just under **main()**) and at the end of the program. The braces are also required at the beginning and end of the **if**, **if else** and **else** blocks because each contains more than one statement. The style is very much like an outline. It is necessary to insert a carriage return when you want to return to the beginning of the next line; whereas, in BASIC, control characters had to be inserted in the print statement if you did not want a carriage return. The two functions

(See Page 16)

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c99—

(Continued from Page 14)

puts(''TYPE TWO CAPITAL LETTERS''); and **c=putchar(10);** could have been combined into one function **puts(''TYPE TWO CAPITAL LETTERS \n'');**. \n is the symbol for carriage return. Note the blank space before **comes** and after **before** in **puts('' comes before '');**. It is necessary to insert blanks to separate the two variables from the character string.

The next example is meant to show how the comparisons are made in the **if(condition)**. If we wish to compare a character stored in variable **a** to the letter **M**, we cannot say **if (a==''M'')** or **if(a=''M'')** as in BASIC. We must compare the character stored in **a** to the ASCII value of the letter **M;** thus, **if(a==77)** or **if(a<=77)**.

Example 3: Input a capital letter, make the proper tests and print out whether the letter input falls in the first half of the alphabet or the last half.

```
int a,b;
main()
{
 puts(''TYPE A CAPITAL LETTER \n'');
 a=getchar();
 b=putchar(10);
 if (a<=77)
 {
  putchar(a);
  puts('' is in the first half of the alphabet.'');
 }
 else
 {
  putchar(a);
  puts('' is in the last half of the alphabet.'');
 }
}
```

In the three examples, the declarations **int a,b,c;** and **int a,b;** could be written **char a,b,c;** and **char a,b;**. Now you try a few variations of your own. Also, make a few mistakes to see the error messages. If you are like me, you probably won't have to make these mistakes intentionally. Also note that just because you had no errors that it doesn't mean that the program is correct. As a practice exercise, rewrite Example 3 substituting **if(a<=''M'')** for **if(a<=77)** and see the results. Good luck!

Miami Users Group BBS moves, Australian TI user visits meeting

The BBS for the Miami Users Group has moved, according to the group's secretary, Burt Schreiber. The new phone number is (305) 386-8295. Sysop is Wolfgang Riesterer.

Schreiber reports that Geoffrey Shipton of Adelelaide, South Australia, "dropped in to say hello" to the Florida group in August, and brought along the latest version of Funnelweb from the Hunter Valley Users Group.

Legends

Dear Mr. Editor,

I feel your glorification of the life of an adventurer in the editorial for the May 13th issue of *Popular Spellcasting* was inaccurate. At best, it isn't easy to be an adventurer. Whether you are fighting the monsters (which are invariably big and ugly) that wander about, or exploring dank, dark and slime encrusted dungeons, an adventurers job is hard, the pay is poor in the beginning and expenses are high, and all too often life is brutally short. Not to say our lot is all bad - as you get a bit more experienced the monsters are easier to kill, traps aren't so tough, and the monetary rewards are very good. However, I think telling it like it is is preferable to convincing a lot of novices to take up the profession. Besides, there is only so much gold and treasure to go around.

- Zarmak the Fighter, Wizards Rock

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Donn Granros and Ed Johnson, the authors, carefully crafted a fine program that features custom assembly language routines for rapid graphics action. Legends requires a TI-99/4A with 32K, TI Extended BASIC and one disk drive, or a Myarc Geneve 9640. It is furnished unprotected and is available from all Asgard Software dealers. Suggested retail:

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By MERLE VOGT

We continue our two-part series begun last issue regarding the power of the Mini-Memory utility.

1. Utility routines accessible through Mini-Memory.

A. Standard utilities. These are named VSBW, VMBW, VSBR, VMBR, VWTR and KSCAN. They give you use of complex code subroutines to do useful things and always work. If called properly, most interface into the VDP 16K RAM through the 9918A video data processor chip and into the screen.

B. Extended utilities. These are named GPLLNK, XMLLNK and DSRLNK. A wide variety of subtask code blocks are set up in the console's ROM and GROM chips. You can use these routines to save enormous amounts of coding labor.

GPLLNK offers about 18 routines. You can change the character sets, process cassette files, concert numbers, do square root and trig functions.

XMLLNK has about 15 more routines. It gives access to floating point arithmetic, number conversions and other.

DSRLNK provides the facilities for you to use disk files of any kind.

C. BASIC interface utilities. There are five of these: NUMASG, STRASG, NUMREF, STRREF and ERR. They provide facilities to transfer data and strings between BASIC programs and assembly subtasks. You can have as many assembly subtasks as you wish attached to a BASIC program and pass any data needed down or up.

D. BASIC subprograms. There are seven of these. They are placed in the BASIC program when used, and accessed by the "CALL" command.

2. Using BASIC subprograms.

Herein we will look at only those most important in the Mini-Mem context. There will be "LOAD" (data), "PEEK" and "LINK".

A. "CALL LOAD". This has a lot of applications, but is clumsy to use.

It places data into RAM, for instance, CALL LOAD(9999,Q,W,E,R). This says, put data in Q, W, E, R into RAM, starting at 9999. Everything has to be expressed in decimal numbers, which especially makes it hard to work with alpha data. LOAD is useful to put the name and address entries into the REF/DEF table in RAM. I will use this for a demo below. Line 1020 makes BASIC create the decimal equal to >B1, (hex). Line 1040 creates the decimal level of >7FE8, (hex).

B. "CALL PEEK". CALL PEEK(31345,Q,W,E,R) pulls data (Q,W,E,R, etc.) out of RAM. It starts at address 31345, and puts the next four bytes into the areas labeled as Q, W, E and R. As before, it is in decimal and you must know what you have grabbed before going on further.

The exclusive use of decimals is irritating to me, as I have been thinking in hex for 30 years.

C. "CALL LINK". This command transfers control out of BASIC into assembly subtasks. See line 1070 in the program in Table 1.

A requirements note: (1) The program "SBTSK1" must have been loaded into RAM at >B100, using Easy Bug. (2) The program's name, "SBTSK1", and the address, ">B100", must have been loaded into the "REF" table. One way is to use "CALL LOAD" as in line 1050 in Table 1 below. Then "LINK" can be used.

The first item, inside parentheses, of LINK is program name, in quotes, "SBTSK1". If needed (but not required), names of data, called parameters, follow, separated by commas. In the parameter list may be data, or strings, both those passed down to the assembly, and those to be passed back up to BASIC. Here, assumed, DA, DB and DC$ are passed down and RA, RB and RC$ are results passed up. There can be 15 parameters.

Upon returning from the assembly subtask, RA, RB and RC$ are valid, and can be used by the BASIC program. You can execute the CALL LINK repeatedly; provide new values in DA, DB and DC$; and receive new results in RA, RB and RC$.

3. How to use BASIC interface utilities.

One premise of this monograph has been about a BASIC program calling assembly subtasks. The interface utilities are the pipeline to get data down to the assembly, and then back up to BASIC. These utilities are assembly code and are coded in the assembly subtask. Let's discuss how they work.

A. NUMREF. This one pulls a number (floating point) out of BASIC making it available to assembly. Be introduced to "FAC" (floating point accumulator). This is an eight-byte space in the console RAM, at address >834A, used constantly for containing floating point numbers resulting from calculations. NUMREF uses registers R0, R1 and FAC.

Assume the following line in the BASIC program:

2030 CALL LINK ("SBTSK3",AA,RR)

Here, data AA is called Parameter 1 and data RR is called Parameter 2. Note that the program code before line 2030 must put a value into AA. Now, see the matching assembly code in "SBTSK3".

```
CLR  R0          If data AA is not
                 in an array, then
                 zero R0.
LI   R1,1        Must put A 1 in-
                 to R1 becaus AA
                 is parameter 1.
NR EQU >6044     NUMREF has
                 address of
```

(See Page 20)

Table 1: BASIC Code showing subprogramming techniques

```
1000  REM  Some initialization first.
1010  REM  Assembly subtask is at address >B100 in RAM
1020  ASYSTART = 11* 256 +1  This is >B1 in decimal.
1030  REM  We will put the LINK into REF/DEF table at >7FE8
1040  REFDEF = 7*4096 + 15 * 256 + 14 * $16 + 8  This is >7FE8 in decimal
1050  CALL LOAD(REFDEF,ASC("S"), ASC("B"),ASC("T"),ASC("S"),ASC("K"),
      ASC("1"), ASYSTART,0  Put program name and address into REF table.
1060  REM  Now we can LINK
1070  CALL LINK("SBTSK1",DA,DB,DC$,RA,RB,RC$
1080  REM  DA, DB, DC$ go to assembly
1090  REM  RA, RB, RC$ are results from assembly.
1100  PRINT RC$,RA;RB
```

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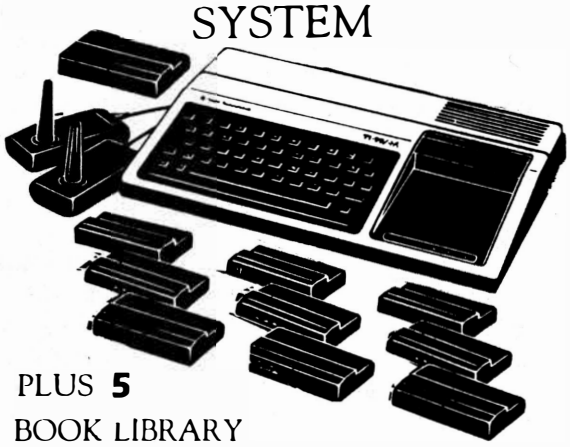

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MINI-MEMORY—

(Continued from Page 18)

```
                >6044
BLWP @NR        Execute
                NUMREF
```

NUMREF places data AA into FAC, and the assembly can use the number.

Now, let's leap ahead, assume that you massage FAC into a result. Let's send it back to BASIC.

B. NUMASG. Reverse of above. See this code:

```
CLR  R0         Since data BB is
                not array variable.
LI   R1,2       Since data BB is
                parameter 2.
NA EQU  >6040   NUMASG is at
                address >6040
BLWP @NA        Go execute
                NUMASG
```

NUMASG shoves FAC into data BB of BASIC program, where it can be used.

C. STRREF and STRASG. These are correlaries of the previous two, but working on string (alpha) information. To start, send a message from BASIC to assembly. Look at this code, BASIC first:

```
2000  A="I AM FROM BASIC"
4000  CALL LINK("SBTSK3",AA$,BB$)
```

Here is the matching assembly to handle AA$, parameter 1.

```
A3 DATA >0F00   A3 is to receive
   BSS  14      AA$, which is 15
                bytes long, so we
                must put >OF
                = HEX 15, for
                length control in
                first byte of area.
   GET STRING AA$
   CLR  R0      Set R0 = 0 since
                AA$ not array
                element.
   LI   R1,1    AA$ is parameter 1.
   LI   R2,A3   String goes to
                area A3.
SR EQU  >604C   Address of
                STRREF.
   BLWP @SR     Puts AA$ into
                A3 area.
```

Now, please let me rave on for a bit. Suppose, at this point, in the assembly code, you tried to print the message in area A3 using the display utility "VMBW". You will get garbage. I have seen much stupidity connected with computers in 30 years. But TI has made its mark in the way its BASIC uses string data. The system adds a value of hex >60 to each alpha byte. It seems totally senseless, but must be lived with. So, to display A3 on the screen, in assembly, you must subtract >60 from each byte of A3. Here is the code to do that.

```
   LI   R5,B3+2    R5 pointing to
                   text B3
   LI   R6,>6060   R6 = offset value
   LI   R7,7       Need 14 bytes
L4 A    R6,*R5+    Do 2 bytes
   DEC  R7         Test done,
   JNE  L4         No, loop back.
```

Then you can send text B3 to BASIC, like this:

```
   CLR  R0         B3 not array
   LI   R1,2       BB$ was parameter 2
   LI   R2,B3      RAM address of
                   B3 into R2, including the
                   length byte.
SA EQU  >6048      Address of
                   STRASG.
   BWLP @SA        Move it.
```

I hope the preceding has introduced the connections between BASIC and assembly. It shows that working with string data is rather clumsy, and uses some complex code; but don't forget it is still 200 times faster than BASIC does it.

4. Using standard utilities.

A. VMBW. This multibyte write to VDP RAM is used mostly to display messages on the screen, but it will write data to any place in the VDP RAM. The screen occupies the address area hex >000 through >2FF. There is space for 24 lines on the screen. I urge that you learn the lines' addresses in hex. It is much easier to use, as follows. Addresses: >000, >020, >040, >060, >080, >100, >120, etc., to >2E0.

Let's display a message on line >200. Routine VMBW uses R0, R1 and R2. See this code, which I think is fairly clear:

```
   LI   R0,>200    Data goes to
                   >200 on the
                   screen.
   LI   R1,A3+2    Remember information under
                   topic 3C.
   LI   R2,14      14 bytes of text
VM EQU  >6028      Address of
                   VMBW routine
   BLWP §VM        Go do it.
```

B. KSCAN. This reads the keyboard. It is not so neat to use as VMBW, has a new game plan.

Console RAM is used. Hex >8374 is specified as "keyboard device number." Its value is normally assigned by the system and you don't have the bother of it.

Address >8375 is where the pressed key data is placed. You must pull out the byte to use it.

Address >837C is one you are going to (as they say) get very, very intimately acquainted with. It is called the "GPL status byte." All GPL activities keep >837C posted about work done. One of its bits is named "condition." You must zero this bit to get KSCAN to work. Then, when GPL returns control back to you, this bit must be examined to find out if KSCAN actually did work. If the bit is still zero, then you must rerun KSCAN until the condition does get set = 1. Then you can pull the byte out of >8375. Finally, you must again zero >837C, because leaving it set can bomb out the next routine used.

Here is a routine to KSCAN and then display the byte scanned, if not garbage, on the screen:

```
CB DATA >2000
ST EQU  >837C
BY EQU  >8375
KS EQU  >6020      Address of
                   KSCAN routine
VS EQU  >6024      Address of single byte write,
                   VSBW
KK CLR  @ST        Zero condition
TS BLWP @KS        Try KSCAN
   COCB @CB,@ST    Test cond. BIT
                   = 1
   JNE  TS         Not yet, so try
                   again.
   MOVB @BY,R1     Now got byte,
                   put it into R1, for
                   VSBW.
   CLR  @ST        Now zero condition again.
   LI   R0,>200    Point R1 to
                   screen.
   BLWP @VS        Writes the byte
                   on screen.
```

5. Using extended utilities.

A. GPLLNK. Routines resident in the console devices called "GROM,S".

(See Page 22)

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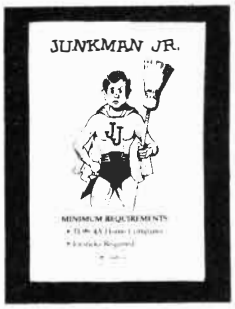

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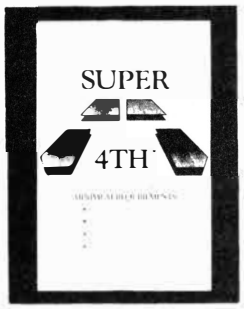

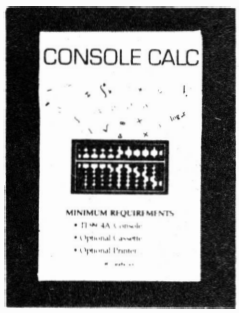

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MINI-MEMORY POWER—

(Continued from Page 20)

It is hard to choose one of these for an example. They fall into two groups, some simple to use, others requiring a complex setup procedure. Let's define some new terms:

FAC = floating point accumulator = address >834A. The 99/4A floating point number system uses an eight-byte data space, located at >834A, constantly to hold results of floating point calculations. It may hold data to be used in a calculation, and receives results of operations.

Status byte = 837C. Back again to haunt us. Must be zeroed before any GPLLNK operation.

B. Data items in NUMREF and NUMASG. Consider data items AA and BB under 3 A and B. Let's make BB become the square root of AA.

First, use the code of 3A using NUMREF to load AA into FAC. Then code this:

```
ST  EQU  >837C     Status address
GP  EQU  >6018     Address of GPLLNK routine.
     CLR  @ST      Always zero status.
     BLWP @GP      Go to GPLLNK.
     DATA >0026    Access code for square root routine.
     CLR  @ST      Status again.
```

Now, FAC should contain the square root of AA; now BB. Proceed with the code of 3B, which will move the value into BB.

6. Relocatable assembly code.

Assembly programming with line-by-line assembler and Mini-Memory has one very large difference in code setup technique.

A. When you create code with the *TI Editor/Assembler* system, the machine code produced is structured not to contain anything to force the code to load into expansion RAM at any fixed address. The loader system can take this code and place it into expansion RAM at any free space area. It will execute there normally. This is called relocatable code.

B. The *Line by line Assembler* uses the opposite approach. All of its product is loaded into specific (absolute) addresses. You always start a coding session by giving the AORG >XXXX command. Absolute origin at address >XXXX, for example, AORG >B500, sets the code location pointer to hex >B500, thenceforth the pointer is advanced per the lengths of code, or data, entered.

Suppose disaster, type in error, or skip a line. The locater is blown and there is garbage in RAM No problem, AORG is always there. Line-by-line has been displaying your typing, and the resulting machine code, as you charged along. Simply examine the code, determine where you blew it, AORG back to that address and go on. You can also AORG forward, to leave an area to work in later.

C. The *consequences* of this system are that instructions and data are locked in solid. When you started at >AORG, that was it. When you save the program onto cassette with Easy Bug, that address goes along too. Reloading by Easy Bug puts the code back at >B500.

D. Semi-relocatable code. I just told you that line-by-line will not produce relocatable code. However, thanks to the clever designer of the TI9900 CPU chip, there is a way to cheat the system and do semi-relocatable code. There is an addressing code called "indexed." First, look at an instruction to move data A3 to A4:

```
MOV @A3,@4
```

That code stuck you somewhere in RAM. Now, see the solution, which changes everything. We will use R9 as the "index" register; note the difference:

```
MOV @A3(R9),@A4(R9)
```

Here, both A3 and A4 still have the same absolute addresses, R9 assumed equal to zero. The absolute addresses no longer matter. If you put a value into R9 then everything can be moved accordingly and the program runs normally.

Consider some numbers. We did the code AORG >B500. Suppose we moved all the code to address >D500 and tried to run. It will not, yet, since R9 is garbage. The difference of >B500 and >D500 is >2000. All we have to do is plan ahead, placing this instruction at the start of the code:

```
LI  R9,>2000
```

That fixes all of the addresses.

Aha! So you don't like it at >D500. Want it at >A500 instead? OK, then do this:

```
LI  R9,>F000
```

Trick: >B500 + >F000 = >A500

E. Relocating code to another area of RAM. Here is how to do it. Check it very carefully.

```
     AORG >2800
     B    >A2
EJ   LWPI 0000
     B    *R11
A2   STWP R12          This and
     MOV  R12,@EJ+2    this save the old
                       W. S. pointer.
     LWPI >2880        Now, set up my
                       W. S. pointer at
                       hex >2880
     LI   R5,>B500     Start of code
     LI   R6,>D500     New location
     LI   R7,<B900     End of code
MV   MOV  *R5+,*R6+    Move 2 bytes
     C    R5,R7        Done ??
     JL   MV           No; do some
                       more
     B    @EJ          Done, exit
```

Enter the routine and exit from line-by-line. Go to Easy Bug and do "E2800". The program is copied to >D500. Then, with Easy Bug: SD500 (TO) D900, getting another copy of the code set up for the relocated position in RAM.

You do not have to relocate by a neat >1000 or >2000. That just makes the mental effort less when you must debug, compared to that required to visualize addresses offset by, say, >600. I absolutely urge that you learn to do hex numbers efficiently, preferably in your head.

7. Modulizing

Back in prehistoric days, there already were very large programs. The IBM supervisor system, called OS, was said to be one to two megabytes in about 1968. There is only one way to manage such monsters: divide and rule. Divide into multitudes of small subtask modules, each with a part of job small enough to be easily grasped. Up a step were "driver" modules that ran groups of subtasks. Further, it is easy to see that in an IBM 360 with 64K of RAM there is no way to stuff in much of a megabyte of supervisor and have some space left for production programs. Result was a quite small master supervisor module to exercise overall control. It was not (could not be) very large. The rest of OS and your code lay in disk files in the form of thousands of subtask modules of manageable size. Everything had to be precisely integrated because they fed each other, the drivers and

(See Page 24)

Geneve

A status report on the 9640

By MIKE DODD

It's finally here. The Geneve 9640 Computer. Here is the current status of some of the Geneve (pronounced "jin EV") software that Myarc is producing:

MDOS — the Disk Operating System for the Geneve. It is based on MS-DOS V2.1 and the commands are very similar or identical to the MS-DOS syntax. This is almost done. Paul Charlton is writing it, with J.Peter Hoddie handling the device drivers. The device drivers are the routines that operate the various devices on the Geneve — disk, RS232, RAM-disk, print spooler, etc. They had to be rewritten from the 99/4A to work in both 99/4A and 9640 mode.

MY-Word — the Word Processor, based originally on TI-Writer. The differences are many: 80 columns, 56K Text Buffer, Editor and Formatter resident in memory, and much more. This is almost totally done. Very few things remain to be done, and Peter Hoddie, the programmer who is handling MY-Word, expects to have it done very shortly.

Advanced BASIC — the new BASIC to take advantage of all the Geneve power, speed, and graphics. From what I am told, this is close to done, but not quite as far along as some of the others. They expect this to be ready for testing within a month or two.

Pascal Run-Time — the Pascal interpreter. This program will run all UCSD Pascal V4.21 programs, of which there are many. This is being handled by Pecan Systems. Progress is slow but sure. It will probably be done by the end of this year. One has to realize that a 9900 (or, in this case, 9995) assembly version of Pascal has never been done. The p-Code card from Texas Instruments was a hardware emulation.

Multiplan — this is not a complete package, but instead patches to TI's Microsoft Multiplan package to run in 80 columns and to utilize the extra memory. It works now, but Myarc plans to try to upgrade it further to use even more memory and have a 26-line display (rather than the current 24 lines).

Cartridge Saver — to save your 99/4A cartridges to disk to run on a Geneve. Written by Peter Hoddie, this is completely done. It saves the cartridges in GRAM Kracker format, so if you already have a GK, then all of your files are still usable.

MY-Numbers — a Lotus 1-2-3 look-a-like program to be ported over from an IBM PC by Paul Charlton. It is hoped that this will be done within a few months.

MY-Art — the super-fast drawing program that utilizes the Myarc Mouse. Boxes, Circles, Lines, Fills, and 256 colors are all present. This is about 98 percent done.

Compatibility with the 99/4A is almost total on the Geneve. There are a few problems, however Protected programs, such as Advanced Diagnostics, DISkASSEMBLER, MG Explorer, and 4A/Talk, will probably not run on a Geneve. The reason for this is that these protections have very critical timing, and while you can adjust the Geneve to be *very* close, you can't get it exactly the same speed. Some companies have plans to convert their software to run on a Geneve. I have heard that DataBioTics, producer of 4A/Talk, is one. Bytemaster Computer Services is offering an unprotected version of MG Explorer that will work on both the 99/4A and 9640. Authors of some other programs also have plans to convert their programs to the Geneve.

Another incompatibility problem is with programs that use a CRU key scan. These programs are few and far between. One is TI Extended BASIC Fortunately, it uses a direct CRU scan only when checking for the F4 (break) key I found that this can be patched quite easily, so that the F4 key works fine. The patch involves changing the ROM code in the Extended BASIC cartridge to use the F4 check present in console ROM, which of course is modified for the 9640.

To make the fix, load a sector editor. The F4 check is in both of the two ROM

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MINIMEM—

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the supervisor. Everybody talking—up and down, back and forth. All you needed to do is blow one byte and you were out, out, out.

These modules were rolled into RAM from disk on a demand basis, as needed. The 99/4A is capable of exactly the same procedure. First create a BASIC program to supervise. Then create the subtasks, up to 24 or them, to be executed by "CALL LINK" commands, as needed. Remember: You can repeatedly "CALL LINK" the same subtask, from 20 different lines in the BASIC, if needful. Caution: You must organize the assembly code that the routine is "reusable." It can then be linked any number of times.

By "reusable" we mean that the code must reset all pointers, accumulators, counters or other data items which get changed when a pass is made through the code. The variables are being fed down by "CALL LINK" and new results will be passed back up to BASIC.

Later on, somebody got fanciful and called this "structured programming," but it was already old, old; reference, Lady Ada Lovelace, 1862.

You can make assembly modules which are callable from other assembly modules. There have to be differences in the code structure compared to a module to be called by BASIC. The pass parameters scheme is different.

So, modularity is the pathway. There is a sort of superviser in the 99/4A, except stupified by too much GPL. Chop the job up into small chunks, solve each chunk, carefully chink the chunks together, and the job is not so tough after all. There is generous space—32K in expansion RAM, using BASIC to drive gives 16K more, 4K of utilities in the Mini-Mem module, and all those other utililties in GPLLNK, XMLLNK and DSRLNK.

Do not get mesmerized by mega K. We ran San Antonio College—10,000 students and 500 professors—on 8K. Finesse against brute force.

GENEVE—

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banks of XB, so it will be saved in the first two files. If you saved your module under the filename of EXTBAS, you would need to edit the files EXTBAS and EXTBAS1. Determine the first sector of each of the files and add 5, so that you are editing the sixth sector of each file. At byte 84 (hex >54), you will find hex digits starting with 020C 0024... Change the first eight bytes to: 06A0 0020 133F 1010. Repeat with the second file.

Modifications to the operating system are quite easy in 99/4A mode. When you are in 99/4A mode, the ROM from >0000->1FFF, and the GROM from >0000->FFFF are unprotected, changing them to RAM and GRAM. The cartridge space from >6000->7FFF can be toggled between ROM and RAM with the GPL interpreter. This flexibilty opens up many possibilities, which we'll explore in future issues.

Since the 9995 was designed to handle only 64K (the same as the 9900), Myarc had to design a method to handle the huge amounts of RAM in the Geneve. Thus, they came up with the Memory Mapper. This device swaps 8K banks in and out of the 64K address space. You can swap any physical 8K block into any logical 8K block. To use it, you write a byte indicating the physical area of memory into one of the eight bytes of the mapper. The mapper starts at >8000 in 99/4A mode.

For example: to locate the 8K physical block at >14000 into logical space >2000, you would write >0A to >8001. Note: the current DOS (as of 7/26/87) uses memory pages >00—>27, so don't attempt to access those pages. There are other bytes you can write to the mapper as well. The final DOS will have a list of allthe free pages, allowing your program to easily pick a free area of memory. First, let's review the Geneve's memory usage in 99/4A mode: 432K CPU memory
16K Cartridge space RAM
64K GRAM
128K VDP memory
32K High speed RAM
16K ROM
In 9640 mode, the memory allocation is:
512K CPU memory
128K VDP memory
32K High speed RAM
16K ROM

That gives a total of 688K in the Geneve, 672K of which is RAM. The following is a list of the bytes you can write to any location in the mapper for 99/4A mode.
>00->35 — the 432K CPU RAM
>00->27 — the DOS, as of 7/26/87.
>28->35 — memory available to the programmer.
>36->37 — bank one and two of the cartridge space RAM
>38->3F — GRAM
>B8->BF — peripheral DSR space
>EC->EF — High speed 32K RAM
>F8->F9 — ROM banks one and two.

Bytes >38->3F allow you to access GRAM through CPU memory. For example: to map GRAM >6000->7FFF (the first bank of the cartridge GRAM space) into CPU >A000, you would write >3B into >8005. Note: when GRAM is mapped into CPU memory, the address is offset by one.

For instance: if you had mapped GRAM >6000 into CPU >A000, as in the example above, to access GRAM >6325, you would have to access CPU >A326. GRAM >73BC would be at CPU >B3BD. GRAM >7FFF would be at CPU >A000. Reading and writing can be done with ease using this method.

The peripheral space is just that — the memory space inside external peripheral cards, such as the disk controller or RS232. Peripheral space >4000, which is where the DSR is normally located, is paged in by byte >BA. Programs that directly access the memory addresses insidethe DSR card, such as PIO for print spoolers (i.e. Fast-Term) or the disk controller chip (i.e. Rapid Copy, REDISKIT) will not work unless they page >BA into memory space >4000 (controlled by byte >8002). The program must save the byte at that address, then restore it after it is done. Otherwise, interrupt and DSR handling may not work. Note that you can page >BA into other areas of memory, as well.

For example, if you paged >BA into memory space >4000, the command register for the TI floppy disk controller chip would be located at >5FF8. If you paged >BA into memory space >2000 (by writing to >8001), the same byte would be accessed by writing to >3FF8.

The high speed 32K is a very fast area of memory. It is used in 99/4A emulation mode to emulate the 8K blocks at >0000, >2000, >A000, and >E000. This is partly responsible for the much higher speed of 99/4A programs.

Due to an unfortunate bug in the hardware of the 9640, while in 99/4A mode you must not map any byte other than >03 into >8006 (the >C000 memory space). If you do, certain aspects of the computer cease working. Sound is one, and there may be other areas as well.

In 9640 mode, the memory mapper bytes are the same, except that bytes

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>36->3F now select banks of the normal 512K CPU RAM.

The 9938 VDP chip is a very powerful graphics processor chip. It is capable of eight graphics modes, plus two text modes. Four of the ten modes are the same as those on a 99/4A. They are:

—Multi-Color mode
—Graphics 1 (the 32 column mode)
—Graphics 2 (the high-resolution mode, 16 colors, 256x192 pixels)
—Text 1 (40-column format)
—The 9938 also has:
—Text 2, which is 80 columns in either 24 or 26 lines
—Graphics 3, the same as Graphics 2 except that this uses Sprite Mode 2 (more on this later)
—Graphics 4, which offers 16 colors and 256x212 pixels
—Graphics 5, 4 colors in 512x212 pixels
—Graphics 6, 16 colors in 512x212 pixels
—Graphics 7, which can use a whopping 256 colors in 256x212 pixels.
—There are other differences, too. On the 99/4A, the "bit-map" mode wasn't actually bit-map — you could have only two colors per eight pixels. However, in graphics modes 4-7, each pixel is totally independent of the others.

In Graphics modes 3-7, the 9938 uses Sprite Mode 2, which allows up to eight sprites on a line (rather than the four in Sprite Mode 1, identical to the mode used on the 99/4A) and selection of two different colors for each line of the sprite.

On graphics modes 4-7, you can use "interlace mode" to double the number of vertical lines, making the highest possible resolution of the Geneve 512x424 pixels.

In future articles, we'll cover the use of various graphics modes from assembly language. The 9938 manual is a neccessity for serious programming of the Geneve. Contact Myarc for more information about obtaining a copy (Myarc Inc., P.O. Box 140, Basking Ridge, NJ 07920, 201-766-1700.) This manual details all of the modes of the 9938 chip, the usage of all of its registers (47 write registers, 10 read registers), and the implementation of many other special devices, such as a mouse, light-pen, and digitizer.

I must warn you, though the 9938 manual is one of those documentation masterpieces worthy of the same high awards given the Editor/Assembler manual. However, it is currently the only source of such information.

99er Show set in D.C.

The Washington D.C./Mid-Atlantic User Groups' 99er show is scheduled for Oct. 24-25 at the Tyson's Corner Sheraton Hotel.

Jim Horn, one of the show's organizers, says that booths are available for $25 each and admission to the event will be $4.

He says that persons attending the event will have access to "excellent transportation to the sights of downtown Washington" via the Washington Metro system.

For further information, contact Horn at P.O. Box 4170, Rockville, MD 20850; (301) 340-7179; or CompuServe ID 76703,603.

Adapting character sets with EFONT

By BILL GASKILL

When the TI-99 first arrived on the market the biggest buyer complaints seemed to be the membrane keyboard and the lack of a lowercase character set in the computer's screen display. With the release of the 99/4A TI addressed the keyboard complaints and also provided a lowercase character set but, as all 99er's know, the 99/4A's lowercase set is merely a smaller implementation of uppercase character design.

It followed that one of the earliest challenges facing many 99/4A owners was the creation of an altered character set that contained true lowercase letters with trailing descenders. Through the efforts of one owner, TI's own Programming Aids I disk came with such a program, but most will admit that it was pretty dismal in appearance and difficult to read.

Not long after Programming Aids 1 was released Extended Software's TYPE WRITER word processor was introduced and it came complete with a fairly decent lowercase set. From then on, other programmers have come up with lowercase character sets, each meeting the goal of providing true lowercase letters, but with varying degrees of success and readability.

Based upon an idea from Chicago TI User Group member John Hedstrom I have come up with my own version, but this one involves a rewrite of the entire character set (ASCII 30-127) rather than just the lowercase letters. The two files listed at the end of this article, EFONT (the assembly version) and EFONT/XB (the Extended

(See Page 28)

```
                MAIN SYSTEM MENU
    A--auditor main program
    B--budget vs actual analysis
    C--calendar editor
    D--change size of a file
    E--configure parameters file
    F--delete records globally
    G--edit the summary file
    H--help file-system overview
    I--merge data files
    J--net worth statement
    K--print file reports
    L--replace items globally
    M--secondary program loader
    N--select subfiles
    O--set up chart of accounts
    P--summarize accounts
    Q--transfer to another menu
    R--terminate auditor program

      Press letter to load program
        or X then <ENTER> for help
```

Table 1

EFONT—

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Basic version) both provide a rather attractive alternative to the characters programmed into the 4/A console. Once loaded, both files alter the standard character sets so that all displayable characters appear in an "emphasized font." An example is shown in Table 1.

Both the EFONT and EFONT/XB fonts remain in effect as long as a running program is being used. Once the BREAK key is pressed or your program crashes, the default character sets in GROM return.

EFONT/XB redefines the characters using the CALL CHAR command available in both TI BASIC and Extended BASIC.

EFONT redefines the character sets by writing new definitions to the Pattern Descriptor Table in VDP Ram. Because TI BASIC does not support the RUN command, which would allow you to redefine the character sets in one program and run another without losing the redefinitions, it is not really practical to use the file in TI BASIC. You would have to have the character redefinition routine performed within the BASIC program being run to use it.

This could be done, of course, but there are two considerations to take into account first; one, the redefinition process takes about 15 seconds to complete in TI BASIC, thus slowing down further an already slow program execution time. Two, there are some who suspect that use of the CALL CHAR statement builds up "garbage" in memory, since it appears to set up a temporary string in VDP RAM when used, and would thus cause additional loss of already limited memory.

When used in Extended BASIC without memory expansion the redefinition process takes about 10 seconds, but it also causes you to give up some memory. The advantages in an XB environment, though, might be worth it. With cassette or disk, you may redefine the character sets in one program and then have the redefinition routine RUN another program, thus saving the emphasized font.

With a cassette system the last line of the redefinition routine would simply be — RUN "CS1".

With a disk system it would be — RUN "DSKn.PROGNAME", where n is the number of the disk drive being used and PROGNAME is substituted with your own program name.

If you are using a "memory-intensive" program you may find that the result is not worth the effort, both because of the slow execution time using CALL CHAR and the fact that additional memory is used that may be too valuable to sacrifice. You'll just have to play with it in your own program environments to see.

EFONT is an entirely different breed of cat. I wrote it in assembly language and assembled it in uncompressed format so that it would run in an Extended BASIC environment. This means that it is loadable via the CALL LOAD command and usable via the CALL LINK command. Once loaded, the file is accessed via CALL LINK and the response is instantaneous.

One disadvantage of it is the need to have a 32K memory expansion unit to use

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EFONT—

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it. A big advantage though is the blinding speed with which it performs.

EFONT grew out of a need to improve the performance of an inverse video menu program I was working on that just took too long to respond to character redefinitions. In the menu program, I used various Extended BASIC commands to alter the character patterns of the lowercase letters so that they would appear on screen as uppercase ones. The color sets of the different character sets were then manipulated so that the lowercase set was the "inverse" color of the uppercase set.

This worked all right, but when a program was run I had to set the lowercase letters back to their proper character patterns. To do this, I simply "ran" each lowercase letter through a CALL CHAR to reset it. It was slooow!

With the creation of EFONT, that all changed. Not only was the menu much more attractive with the emphasized font, but the redefinition time, back to lowercase character patterns, was negligible. In fact, it is so fast you cannot tell that it even takes place.

Another advantage of EFONT over EFONT/XB is that it may be recalled at any time with a CALL LINK, even after the BREAK key has been used or a program crashes.

EFONT is used by creating the following program as LOAD on any of your diskettes or including line 1 in a program you are using. Of course EFONT must be on the same disk as any program it is to RUN.

```
1 CALL INIT :: CALL LOAD("DSK1.
EFONT") :: CALL LINK("NWCHAR")
2 RUN "DSK1.PROGNAME"
```

If you wanted to use EFONT with the Inverse Video Menu that appeared in the June 1987 issue of MICROpendium, you would substitute line 570 below for line 570 in the program as listed, then simply erase lines 580-660.

```
570 CALL LINK("NWCHAR") ::
RETURN
```

I have included the source code and the comments that follow so that you may alter the character re-definitions if desired and so that you can understand something of how the process takes place. If you decide that you want to change the program in any way, remember that the program must NOT be assembled using the C (compress) option, as XBASIC will not be able to read the resultant object code. The load time for the uncompressed object code is almost the same as the time it takes the XBASIC version to re-define the character set.

You can see for yourself by running the Extended BASIC version and then running the EFONTDEMO program. EFONT/XB displays the entire character set and allows you to see each individual character being re-defined. Once EFONT is loaded it converts the entire character set instantaneously. Actually faster than you can blink your eyes. Try both of them if your system permits. They provide an interesting comparison.

EFONT PROGRAM EXPLANATION

The following explanation assumes that you are following the listing at the end of this article or that you have keyed in the EFONT/S file with TI-Writer and have printed it from the Editor using L PIO or L RS232, etc. to get a listing of the source code with line numbers. This will be necessary to follow the explanation.

004 — Makes the defined labels NWCHAR and VMBW part of the object code and adds the labels to the REF/DEF table.

005 — Equates the label VMBW with the address >2024, which is the workspace pointer for VMBW. VMBW is a resident utility programmed into the TI that writes the number of bytes indicated in R2 (784) from the RAM buffer that is pointed to by R1 (CHRDEF) to the VDP RAM buffer pointed to by R0 (1008). This explanation, taken right out of the Editor/Assembler manual, is a confusing way of saying that the routine copies the information in the DATA statements from low memory into VDP RAM where it must be put in order to access the Pattern Descriptor Table.

006-103 — Contain the hexidecimal patterns for each character.

105 — Is the operation LINKED to by XBASIC by calling the label NWCHAR (which was DEFined in line 4). R0 (register zero) is then given the address 1008, the address of the cursor, which is the first character to be included in the re-definition.

106 — References or identifies the information that is to be copied into the VDP RAM buffer. The label CHRDEF is used to identify which info is to be copied. 106 gives a command that is akin to a GOSUB and READ in XBASIC. Literally, it is saying, "Load Immediate(ly), into Register 1, the data found in the symbolic reference called CHRDEF."

107 — Contains the number of bytes to be copied into VDP RAM, in this case 784. This number was arrived at by multiplying 98 words, (ASCII 30-127) by 8, (characters use 8 bytes each).

108 — Is the command to Branch and Load Workspace Pointer at >2024, which is the address of the VMBW Equated in line 5. This carries out the copying of data from low memory to the VDP RAM buffer.

109 — Contains a pseudo-instruction used to cause the return to XBASIC after character re-definition is done.

110 — The END statement, is an assembler instruction used to indicate the END of the program and thus the end of the code to be assembled.

Finally, the decimal address for the cursor, decimal 1008, is arrived at by adding 768 to the product of 8 times the ASCII code for the character, in this case 30: 8=240+768=1008.

If you wished to re-define only the lower case characters the address 1544 would be used: 8=776+768=1544.

In summary, what happens in this program is that the VDP RAM chip is accessed (this is where screen displays originate) by this program and the Pattern Descriptor Table is entered at the address of the cursor (decimal 1008). From that point, each successive address is also accessed and the re-defined character set is written into the PDT a total of 98 times or 784 bytes worth, so that the standard character set is in effect "over-written" by the new definitions. Of course these new definitions only remain in VDP RAM as long as you are using a running program. As soon as the program ends or crashes or is broken, the standard character set is recalled from console GROM to take their place.

If you are interested in further explanation of how this process takes place or would like to do some exploring on your own I recommend the publications listed below. They are the sources that I used in attempting to understand how one goes about redefining characters in assembly language and what actually takes place inside the computer when it does happen.

The format for the EFONT file was sort of a gift, as the idea came from an original program that was written by David Migicovsky, which appears in Ralph Molesworth's book "Introduction to Assembly Language for the TI Home Computer." The end product, however, is entirely different from that which appears in the Molesworth book. It took a little time to research and put it all together, but the results were well worth the effort.

REFERENCES

Editor/Assembler Manual, page 248, explanation of VMBW; page 207, explanation of RT function.

The Smart Programmer, page 3, May/84, explanation of the standard character set source; page 3, Apr/84, explanation of how to arrive at the decimal address of the character set in the PDT.

Ralph Moleworth's book (*Introduction to Assembly Language for the TI Home Computer*) — the entire publication has served as the most illustrative book on TMS9900 assembly language programming I have found to date.

MG's *Explorer* manual, source of information for a variety of addresses, architecture, etc.

Wayne Stith's *KWIKFONT* tutorial, for certain aspects of assembly language programming it is the best source of information I found. It is by far the most understandable since the author wrote it from a novice's point of view rather than making the assumption, like the E/A manual, that everyone already knows how to program in assembler. This tutorial may be obtained for $6 from Wayne Stith, 715 Timken, Richmond, VA 23229.

EFONT Demo Program

```
1 !EMPHASIZED FONT CHARACTER
 SET FOR XB WITH 32K
 By Bill Gaskill
2 CALL CLEAR :: PRINT " !""#
```

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EFONT—

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```
$%&'()*+,-./0123456789:;<=>?
@ABCDEFGHIJKLMNOPQRSTUVWXYZ[
\]^`abcdefghijklmnopqrstuvwx
yz{¦}~"
3 ON ERROR 6
4 CALL LINK("NWCHAR")
5 GOTO 5
6 CALL INIT :: CALL LOAD("DS
K1.EFONT"):: RETURN 4
```

EFONT/XB (16K)

```
1 !EMPHASIZED FONT CHARACTER
 SET FOR XB WITH 16K
 By Bill Gaskill
2 CALL CLEAR :: PRINT " !""#
$%&'()*+,-./0123456789:;<=>?
@ABCDEFGHIJKLMNOPQRSTUVWXYZ[
\]^`abcdefghijklmnopqrstuvwx
yz{¦}~"
3 FOR L=1 TO 94
4 READ C$
5 CALL CHAR(L+32,C$)
6 NEXT L
7 GOTO 102
8 DATA 183C3C1818001800
9 DATA 6666662400000000
10 DATA 6C6CFE6CFE6C6C00
11 DATA 183E603C067C1800
12 DATA 00C6CC1830660C00
13 DATA 386C3876CCCC7600
14 DATA 0C0C180000000000
15 DATA 0C18303030180C00
16 DATA 30180C0C0C183000
17 DATA 00663CFF3C660000
18 DATA 0018187E18180000
19 DATA 0000000000181830
20 DATA 000000FE00000000
21 DATA 0000000000181800
22 DATA 000060C183060C000
23 DATA 7CC6CEDEF6C67C00
24 DATA 1838181818187E00
25 DATA 3C66061C30667E00
26 DATA 3C66061C06663C00
27 DATA 1C3C6CCCFE0C0C00
28 DATA 7E607C0606663C00
29 DATA 1C30607C66663C00
30 DATA 7E66060C18181800
31 DATA 3C66663C66663C00
32 DATA 3C66663E060C3800
33 DATA 0018180018180000
34 DATA 0018180000181830
35 DATA 0E18306030180E00
36 DATA 00007E007E000000
37 DATA 70180C060C187000
38 DATA 3C66060C18001800
39 DATA 7CC6DEDEC0C07800
40 DATA 183C66667E666600
41 DATA FC66667C66666FC00
42 DATA 3C66C0C0C0663C00
43 DATA F86C6666666CF800
44 DATA FE6268786862FE00
45 DATA FE6268786860F000
46 DATA 3C66C0C0CE663E00
47 DATA C6C6C6FEC6C6C600
48 DATA 3C18181818183C00
49 DATA 1E0C0C0CCCCC7800
50 DATA E6666C786C66E600
51 DATA F060606062 66FE00
52 DATA C6EEFEFED6C6C600
53 DATA C6E6F6DECEC6C600
54 DATA 386CC6C6C66C3800
55 DATA FC66667C6060F000
56 DATA 78CCCCCCDC781C00
57 DATA FC66667C6C66E600
58 DATA 3CE670380E663C00
59 DATA 7E5A181818183C00
60 DATA C6C6C6C6C6C67C00
61 DATA C6C6C6C6C67C3800
62 DATA C6C6C6D6FEEEC600
63 DATA C6C66C38386CC600
64 DATA 6666663C18183C00
65 DATA FEC68C183266FE00
66 DATA 7C606060606 07C00
67 DATA 00C0603018 0C0600
68 DATA 3E0606060606 3E00
69 DATA 001038 7C10101000
70 DATA 00000000000000FF
71 DATA 3030180000000000
72 DATA 0000780C7CCC7600
73 DATA E0606078666 6FC00
74 DATA 00003C6660663C00
75 DATA 0E06063E66663F00
76 DATA 00003C667E603E00
77 DATA 1C3630783030 7800
78 DATA 0000 76CCCC7C0CF8
79 DATA E0606C766666E600
80 DATA 1800381818183C00
81 DATA 0C000C0C0CCCCC78
82 DATA E0606C666C786CE600
83 DATA 7030303030307800
84 DATA 0000CCFED6C6C600
85 DATA 00007C6666666600
86 DATA 00003C6666663C00
87 DATA 0000DC66667C60F0
88 DATA 000076CCCC7C0C1E
89 DATA 0000DC766060F000
90 DATA 00007CC07C06FC00
91 DATA 10307C3030361C00
92 DATA 0000CCCCCCCC7E00
93 DATA 00006666663C1800
94 DATA 0000C6D6FEFE6C00
95 DATA 0000C66C386CC600
96 DATA 00006666663E067C
97 DATA 0000FE4C18327E00
98 DATA 1C3030603030 1C00
99 DATA 1818180018181800
100 DATA 38C0C0C060C0C3800
101 DATA 000020745C080000
102 GOTO 102 !RUN "CS1" OR R
UN "DSK1.PROGNAME"
```


EFONT/XB (32K)

```
* EMPHASIZED FONT CHARACTER SET FOR XB WITH 32K RAM
* By Bill Gaskill
* USE:  CALL LOAD("DSK1.EFONT") :: CALL LINK("NWCHAR")
       DEF NWCHAR,VMBW
VMBW   EQU  >2024
CHRDEF DATA >0000,>0000,>00FF,>81FF cursor
       DATA >0000,>0000,>0000,>0000 edge character
       DATA >0000,>0000,>0000,>0000 space
       DATA >183C,>3C18,>1800,>1800 !
       DATA >6666,>6624,>0000,>0000 "
       DATA >6C6C,>FE6C,>FE6C,>6C00 #
       DATA >183E,>603C,>067C,>1800 $
       DATA >00C6,>CC18,>3066,>C600 %
       DATA >386C,>3876,>CCCC,>7600 &
       DATA >0C0C,>1800,>0000,>0000 '
       DATA >0C18,>3030,>3018,>0C00 (
       DATA >3018,>0C0C,>0C18,>3000 )
       DATA >0066,>3CFF,>3C66,>0000 *
       DATA >0018,>187E,>1818,>0000 +
       DATA >0000,>0000,>0018,>1830 ,
       DATA >0000,>007E,>0000,>0000 -
       DATA >0000,>0000,>0018,>1800 .
       DATA >0006,>0C18,>3060,>C000 /
       DATA >7CC6,>CEDE,>F6C6,>7C00 0
       DATA >1838,>1818,>1818,>7E00 1
       DATA >3C66,>061C,>3066,>7E00 2
       DATA >3C66,>061C,>0666,>3C00 3
       DATA >1C3C,>6CCC,>FE0C,>0C00 4
       DATA >7E60,>7C06,>0666,>3C00 5
       DATA >1C30,>607C,>6666,>3C00 6
       DATA >7E66,>060C,>1818,>1800 7
       DATA >3C66,>663C,>6666,>3C00 8
       DATA >3C66,>663E,>060C,>3800 9
```

(See Page 31)

REGENA—

(Continued from Page 12)

```
1090 PRINT "ENTERED.  YOU MA
Y 'SAVE'"
1100 PRINT "THESE NAMES THEN
 START"
1110 PRINT "ANOTHER FILE."
1120 PRINT :"PRESS ANY KEY T
O GO TO"
1130 PRINT "THE MAIN MENU SC
REEN."
1140 CALL KEY(0,K,S)
1150 IF S=1 THEN 1190 ELSE 1
140
1160 PRINT N;"NAME";
1170 INPUT NAME$(N)
1180 IF NAME$(N)<>"" THEN 10
40
1190 N=N-1
1200 RETURN
1210 REM
2000 PRINT "SAVE INFORMATION
"
2010 GOSUB 500
2020 OPEN #1:D$,OUTPUT,INTER
NAL,FIXED 128
2030 PRINT #1:N
2040 PRINT
2050 FOR C=1 TO N
2060 PRINT C;NAME$(C)
2070 PRINT #1:NAME$(C)
2080 NEXT C
2090 CLOSE #1
2100 RETURN
2110 REM
3000 PRINT "LOAD INFORMATION
"
3010 GOSUB 500
3020 OPEN #2:D$,INPUT ,INTER
NAL,FIXED 128
3030 INPUT #2:N
3040 PRINT
3050 FOR C=1 TO N
3060 INPUT #2:NAME$(C)
3070 PRINT C;NAME$(C)
3080 NEXT C
3090 CLOSE #2
3100 RETURN
3110 REM
4000 PRINT "PRINTING NAMES"
4010 PRINT :
4020 FOR C=1 TO N
4030 PRINT C;NAME$(C)
4040 NEXT C
4050 PRINT :"PRESS <ENTER>
"
4060 CALL KEY(0,K,S)
4070 IF K<>13 THEN 4060
4080 RETURN
4090 REM
5000 PRINT "QUIT PROGRAM"
5010 PRINT :"IF YOU END NO
W, ALL DATA"
5020 PRINT :"IN COMPUTER WIL
L BE LOST."
5030 PRINT :"CHOOSE:"
5040 PRINT :"1  RETURN TO MA
IN MENU"
5050 PRINT :"2  END PROGRAM"
5060 CALL KEY(0,K,S)
5070 IF K<50 THEN 5100
5080 IF K>>49 THEN 5060
5090 RETURN
5100 PRINT :"END PROGRAM
"
5110 END
```

EFONT/XB (32K)

(Continued from Page 30)

```
DATA >0018,>1800,>1818,>0000 :
DATA >0018,>1800,>0018,>1830 ;
DATA >0E18,>3060,>3018,>0E00 <
DATA >0000,>7E00,>7E00,>0000 =
DATA >7018,>0C06,>0C18,>7000 >
DATA >3C66,>060C,>1800,>1800 ?
DATA >7CC6,>DEDE,>C0C0,>7800 @
DATA >183C,>6666,>7E66,>6600 A
DATA >FC66,>667C,>6666,>FC00 B
DATA >3C66,>C0C0,>C066,>3C00 C
DATA >F86C,>6666,>666C,>F800 D
DATA >FE62,>6878,>6862,>FE00 E
DATA >FE62,>6878,>6860,>F000 F
DATA >3C66,>C0C0,>CE66,>3E00 G
DATA >C6C6,>C6FE,>C6C6,>C600 H
DATA >3C18,>1818,>1818,>3C00 I
DATA >1E0C,>0C0C,>CCCC,>7800 J
DATA >E666,>6C78,>6C66,>E600 K
DATA >F060,>6060,>6266,>FE00 L
DATA >C6EE,>FEFE,>D6C6,>C600 M
DATA >C6E6,>F6DE,>CEC6,>C600 N
DATA >386C,>C6C6,>C66C,>3800 O
DATA >FC66,>667C,>6060,>F000 P
DATA >78CC,>CCCC,>DC78,>1C00 Q
DATA >FC66,>667C,>6C66,>E600 R
DATA >3C66,>7038,>0E66,>3C00 S
DATA >7E5A,>1818,>1818,>3C00 T
DATA >C6C6,>C6C6,>C6C6,>7C00 U
DATA >C6C6,>C6C6,>C67C,>3800 V
DATA >C6C6,>C6D6,>FEEE,>C600 W
DATA >C6C6,>6C38,>386C,>C600 X
DATA >6666,>663C,>1818,>3C00 Y
DATA >FEC6,>8C18,>3266,>FE00 Z
DATA >7C60,>6060,>6060,>7C00 [
DATA >00C0,>6030,>180C,>0600 \
DATA >3E06,>0606,>0606,>3E00 ]
DATA >0010,>387C,>1010,>1000 ^
DATA >0000,>0000,>0000,>00FF
DATA >3030,>1800,>0000,>0000
DATA >0000,>780C,>7CCC,>7600 a
DATA >E060,>607C,>6666,>FC00 b
DATA >0000,>3C66,>6066,>3C00 c
DATA >0E06,>063E,>6666,>3F00 d
DATA >0000,>3C66,>7E60,>3E00 e
DATA >1C36,>3078,>3030,>7800 f
DATA >0000,>76CC,>CC7C,>0CF8 g
DATA >E060,>6C76,>6666,>E600 h
DATA >1800,>3818,>1818,>3C00 i
DATA >0C00,>0C0C,>0CCC,>CC78 j
DATA >E060,>666C,>786C,>E600 k
DATA >7030,>3030,>3030,>7800 l
DATA >0000,>CCFE,>D6C6,>C600 m
DATA >0000,>7C66,>6666,>6600 n
DATA >0000,>3C66,>6666,>3C00 o
DATA >0000,>DC66,>667C,>60F0 p
DATA >0000,>76CC,>CC7C,>0C1E q
DATA >0000,>DC76,>6060,>F000 r
DATA >0000,>7CC0,>7C06,>FC00 s
DATA >1030,>7C30,>3036,>1C00 t
DATA >0000,>CCCC,>CCCC,>7E00 u
DATA >0000,>6666,>663C,>1800 v
DATA >0000,>C6D6,>FEFE,>6C00 w
DATA >0000,>C66C,>386C,>C600 x
DATA >0000,>6666,>663E,>067C y
DATA >0000,>7E4C,>1832,>7E00 z
DATA >1C30,>3060,>3030,>1C00 {
DATA >1818,>1800,>1818,>1800 |
DATA >380C,>0C06,>0C0C,>3800 }
DATA >0000,>0000,>0000,>00FF ~
DATA >0000,>0000,>0000,>0000 *127

NWCHAR LI R0,1008
       LI R1,CHRDEF
       LI R2,784
       BLWP @VMBW
       RT
       END
```

Support our advertisers!

Super X-BASIC VRS 120

Super describes it in every way

By HARRY BRASHEAR

The Triton Co, through no fault of its own, is running an advertisement in its latest catalog that is incorrect

Triton ran out of Extended BASIC modules and approached MG to design the software for a new one. At that time it was decided to add a few new CALL commands to the cartridge to make things a little easier on folks.

With this in mind, and the fact that MG is timely on delivery, Triton ran the ad. By the time the product was finished and ready for production there were 29 new CALLs, three new commands, four radically new features and eight modifications. And while all of this SHOULD have been enough, they also included a ROM version of DRAW & PLOT. Do I have your attention?

If I had not stumbled across a videotape of Craig Miller doing a demo of the cartridge, I would no doubt just passed Super XBASIC by. I have had some experience with other "supers" and have been bitterly disappointed. Not so with this one, it's worth every penny of the $59.95 price.

To quote the TI-Writer instruction manual, "Let's do it!"

Auto load bypass: No need to wait for the system to see if there is a "LOAD" program in drive one. When you select Super XBASIC from the power-up menu, keep your finger on a letter key and you will get the "Ready" sign immediately, just like BASIC. If you want the auto load, make your selection as usual.

New editing features: Here you get an extra key to press for some real time-savers. FCTN-SHIFT D (right arrow) will take the cursor to the end of a program line. FCTN-SHIFT S (left arrow) will take the cursor to the beginning of the line. FCTN-SHIFT E or X will move the cursor up and down through the line of code on whatever column the cursor is on. CTRL S or D moves the cursor five characters at a time left or right, CTRL W is a "word tab" where the cursor moves over to the next word after a space character. CTRL C will delete everything to the right of the cursor and CTRL Z everything to the left. I also should point out that the cursor has been redefined as an underscore.

Review

Report Card

Performance.....A
Ease of Use.....A
Documentation .....A
Value.....A
Final Grade.....A

Cost: $59.95
Manufacturer: Triton Products, P.O. Box 8123, San Francisco, CA 94128
Requirements: Console, 32K needed for some commands.

Resequencing: The command RESEQUENCE has been eliminated. Nobody could spell it anyway, so they always used RES, which is still there, in spades!

You can now resequence blocks of your program instead of the whole thing being done automatically. For instance, entering RES 20,5 used to start the program with line number 20 and increment it by five — the whole program. Now you can say RES 20,5,100-250 and you will resequence *only* lines 100 to 250 by fives, starting with line 20. There are other ways of handling this operation, too, including the use of blank commas. RES ,,100-500 would use the defaults of starting with line 100 and resequencing by 10s.

What a blessing. Remember how you used to put your subprograms at the bottom starting with line 5000, so you had room to program in, and the first time you typed RES you lost it all? Never more! The only thing I don't care for here is that undefined line numbers are now left alone. I used to like the fact that "32767" always came up because it stuck out like a sore thumb. I will have to be a little more careful from now on.

Trace: Dump to the printer instead of the screen. Need I say more? Bet you are going for your checkbook right now.

Yes, my friends, you will never have to sit and watch your graphics drift off the screen with the trace numbers pouring up from the bottom again. And never again will you beat up your break key trying to stop the trace in just the right spot. Just OPEN #123:"PIO" on the first program line, type TRACE and relax. Every line number is dumped to the printer just like the screen display. You can also vary the length of the line by making the open file a VARIABLE n. The #123 is the key that sets all this in motion, and no other number can be used.

You can also send the trace to a disk. The old screen trace still works the same way for those who don't own a printer.

List: You may LIST to your printer in any row length you wish. To some people this may not be important, but for those of us who publish, it's really handy to say LIST "PIO":28:100- and have the entire program printed out in 28 columns, just as it appears on the screen. The length can be any number from 1 to 255, which is also handy if you have a 15-inch printer.

Remember that all of the preceding commands are "enhancements" and all of the old methods, such as RES and LIST, will still work.

Three new editing features, MOVE, COPY and DEL, require little explanation, but what they do is valuable to the programmer.

MOVE 100-150,255,5 will move lines 100 to 150 from their present position to start line 255 and increment it by fives.

COPY 100-150,255,5 would copy the lines into the same space, by the same increment, and leave 100-150 alone.

DEL 100-150 will delete just those lines from your program.

Since there are 29 new CALLS, I can't give each one of them as much room as I would like. Some of them do great things, some don't. All have value.

CALL CLOCK: This is a little interrupt clock that appears in the upper right corner of your screen. When it is called, it starts at zero, but a prompt line comes up at the same time to set it to a specific time if you like. I found that, for the most part, it will remain there during most XBASIC programs and even through a *new* command. CALL CLKOFF will get rid of it. Keep in mind that it is not a real clock

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SUPER XB—

(Continued from Page 32)

and during disk access it stops. Otherwise, it keeps pretty good time.

CALL COLORS(f,b): Sets all character sets to the foreground and background colors you want. No waiting, no loops. Only the edge characters are left out of the process.

CALL KEYS(keylist,num.variable): This is going to require a little explanation. At first glance, it seems like VALIDATE, and it is. On the other hand, it seems like the old CALL KEY(0,K,S), and it is, except you don't have to go through all those IF-THEN-ELSE's that come after it. Here's an example of how it works.

```
CALL KEYS("SDEX",A::ON A GOTO 100,200,300,400
```

The system waits until one of the four keys in question is pressed and the "count" is passed to the numeric "A", just like an ON GOTO or ON GOSUB. You have the power of a VALIDATE, the byte savings of not using the IF-THEN-ELSE and the efficiency of the CALL KEY.

CALL ALL(): This call will probably find its use in graphics. It fills the screen with the character that corresponds to the ASCII number you have placed between the parentheses. The function works quickly and, if you have redefined the character, it can probably serve as a sort of curtain between things.

CALL CLSALL: Closes all files at one time. If you program bulletin boards, this one would be great.

CALL BEEP and CALL HONK produce the normal input and error sounds. CALL CHIMES produces that fairy dust that one of the terminal programs is so famous for.

Some new key checks in this program may come in handy. CALL ALOCK checks for the status of the alpha lock. CALL CTRL, CALL FCTN and CALL SHIFT do the same for their respective keys. Also, CALL QUITOFF and QUITON toggle the key of the same name.

CALL GOSPRT and CALL STSPRT: Start and stop all sprites at one time. These calls will give you greater action ability and superior graphics capabilities. You may place different colored sprites on top of each other for multicolored creatures or objects, and then start them moving without any gaps. You could also make much larger images just touching each other and move them as one unit. I predict some great new games out of these new commands.

CALL CAT(): This one produces a catalog of any valid drive number, or RAM. If you are working on a program, no problem, you won't lose it.

CALL GOTO() and CALL GOSUB(): They're different because you can use numeric variables for the line numbers. Other computers have been doing this for a long time and the ability to do this could come in handy for adventure programs. Think about it. To be able to GOTO various line numbers based on the outcome of a numeric variable would be fantastic, and save a lot of bytes.

CALL RUNPROG(): Acts the same as using "RUN DSKn...." in a program, except you can use a subscript instead of the program and device name.

CALL RESTORE() operates in the same manner. A numeric variable can be used instead of a line number.

CALL SCROFF and CALL SCRON: Turns the screen off an on in a running program. Consider putting up the text with the screen off and turning it back on when it's ready to read.

CALL NEW and CALL BYE can be implemented from within a program to shake out the RAM before a new program comes aboard or to return to the boot memory.

And, of course, no MG-created utility would be without CALL PEEKG, CALL POKEG, (for tiptoeing through the GROM and GRAM) and CALL PEEKV, CALL POKEV for playing with the VDP.

We TIers are noted for getting the most for our money, so if you haven't written the check yet, I am now going to make you beg Triton or Tex-Comp to take your money.

Type CALL FILES(2), NEW, CALL INIT, CALL.... Holy shades of Mona Lisa! They built in DRAW AND PLOT! I don't know where they put it, but they fit it in without getting into nitrogen cooling. It has some limitations, but, all in all, it can be programmed to perform almost any function you want. First, a list of the links:

```
CALL LINK("GCLEAR")
CALL LINK("MOVE",x,y)
CALL LINK ("DRAW",x,y)
CALL LINK("CIRCLE",x,y,z)
CALL LINK("SQUARE",x,y,z)
CALL LINK("LABEL"," ")
CALL LINK ("SHOW")
CALL LINK ("EDIT")
```

GCLEAR clears out the graphics memory and gets things ready to accept the drawing by placing the "pen" in the lower left corner.

MOVE sets the pen to the X/Y coordinates you select. These points are within 256 columns by 192 rows.

DRAW draws a line between the present pen location to the X/Y indicated.

CIRCLE will give you a circle based on the center being at X/Y and the radius (Z) given.

SQUARE draws a square with the lower left corner being at X/Y and the height of (Z).

LABEL will place text at the last pen location or location set by MOVE.

SHOW moves a drawing to VDP RAM and displays it on the screen. I should point out that when drawing from within a program, you cannot watch it being done. When the program finally encounters SHOW, it all comes up at once. The program stops at SHOW like a GOTO loop and will not continue until you press the letter E. The drawing the disappears and the program continues.

There are also four screen dump LINKS, one each for small and full-page dumps for either Epson/Gemini or Prowriter protocols.

Finally, EDIT gives you full, visible drawing ability using a joystick. In this mode, the keyboard is scanned for various keys to FILL, WRITE/ERASE, DRAW CIRCLE, BOX etc. You can leave this mode with the "E" press and then go on with a program.

What can be done? Well, being able to open two files gives you the ability to make up graphs automatically, based on integer figures. You can generate designs and patterns and save the results.

Take note also that TI-Artist pictures are the same format as D&P saves. You can bring in an Artist picture, program some titles, then show it or dump it as need be.

My only wish was to be able to CALL DRAWNPLOT from within the XBASIC environment. Maybe somebody can whip up a "hook" of some kind that will be able to do this.

The Super XBASIC package includes the TI Extended BASIC manual and another

(See Page 34)

PC Connection

Switching back and forth

By JOHN KOLOEN

TI hobbyists who use PCs at work or school, particularly for text processing, have had few options when it comes to taking their work home. Either they could transmit text files via a modem or do the job twice, once on a PC and once on the TI.

That's beginning to change. Users of the CorComp disk controller have a new tool in the company's PC Connection, a cartridge-based program that transfers TI text files into a PC format, and vice versa.

Performance: PC Connection is an easy-to-use utility. I didn't even have to look at the documentation to start transferring files. All you do is plug the cartridge in and select the PC Connection option from the menu.

Then, you decide whether to transfer a TI text file to a PC-DOS (or MS-DOS) readable format or PC to TI format. (The program requires two floppies: DSK1 is reserved for the PC disk and DSK2 is for the TI disk.) The program then reads the directory of the TI or PC disk, depending on whether you want to transfer the PC to TI, or vice versa.

After the directory appears on the screen, you enter a letter "C" for copy beside each of the files you wish to transfer. (The arrow keys are used to position the cursor alongside the files you wish to copy and to page through the directory.) Then you enter FCTN 6 (PROCEED) and the file transfer process begins. Pressing FCTN 9 causes the program to jump back to the main menu.

The transfer is done rapidly enough so that benchmarks are pointless. Most files I've transferred have been done in 30 seconds or less.

One of the 40 or so files I've transferred couldn't be loaded by the receiving computer, but I've not been able to figure out why. However, I could not repeat this problem since the process was successful on the second run.

One thing you have to keep in mind is that the program doesn't check for errors in filenames. For example, a PC filename cannot use a slash, which can be used with a TI file. Using a prohibited character will result in a filename that cannot be loaded by the receiving operating system. You do this once and you don't do it again.

PC Connection can handle ASCII files up to 23K. Non-ASCII files, such as those created by Multimate and several other PC word processing programs, must be converted to ASCII before they can be read by PC Connection. Only D/V80 files from the TI can be converted into PC files.

In addition to copying files, users may also delete and rename TI and PC files. Users may also protect and unprotect TI files.

Of course, if you can convert a file or program into an ASCII readable format you may be able to transfer it using PC Connection. The Print and File commands of Multiplan create ASCII readable spreadsheets. These may be imported to Lotus 1-2-3, for example, on a PC. Similarly, many PC database programs provide utilities to convert data into ASCII files. The documentation that comes with PC Connection provides a seven-line program designed to create a D/V80 file from an I/F100 TI file created by Navarone's Data Base Manager program. The program can be adapted to make similar transformations of files with other characteristics.

Ease of Use: As noted above, I didn't need the manual to figure out how the program runs. Anyone familiar with the 4A function keys should have no problem with PC Connection.

Documentation: The booklet-length manual is as good as it needs to be. It describes how to use the program and gives enough information about transferring files to whet the appetite of anyone who longs to bring their PC work home with them. Even so, I gave it a grade of "B." Why? Because it only "whets" the appetite. A couple of more pages focusing on tips to transfer files from a non-D/V80 format into a D/V80 format (or non-ASCII into ASCII) would have been useful and would enhance the value of PC Connection to users. I think CorComp met its minimum obligation in this manual, but that's not enough to earn an "A."

Final Grade: My biggest problem with PC Connection is that it works only with CorComp disk controllers. I think CorComp has missed the boat in this regard.

Although I highly recommend PC Connection to those with CorComp controllers, the company is missing out on a larger part of the market by not supporting Myarc's disk controller. (The TI disk controller won't work because it doesn't support double-density.) Those with a Myarc disk controller will just have to wait until a young Australian programmer finishes his Myarc-compatible PC transfer program (see Newsbytes). Meanwhile, CorComp users can get on with it.

Review

Report Card

Performance ..... **A**
Ease of Use ..... **A**
Documentation ..... **B**
Value ..... **A**
Final Grade ..... **A**

Cost: $49.95
Manufacturer: CorComp Inc., 2211-G Winston Rd., Anaheim, CA 92806, (714) 956-4450
Requirements: console, CorComp disk controller, two floppy disk drives

SXB—

(Continued from Page 33)

24-page booklet that covers all the new commands and the DRAWNPLOT directions. In my opinion, this is the best thing to come along for our machine since RAMdisks. If you are a dedicated TIer like me, you can't do without this cartridge. It will make your life much easier and open up a whole new world of programming.

I want to make one thing clear. Super XBASIC is the *same* XBASIC that has always been there for us. As long as you stay out of the new commands, anybody can run any program you make up. Given a little time, though, you are going to find more and more programs using the new com-

(Continued on Page 38)

Newsbytes

Third party product for Geneve set

Disk Only Software, headquartered in Lorton, Virginia, announces a software development contract with Dr. Jerry Coffey of Vienna, Virginia.

Jeff Guide of DOS said he believes the contract, for JUMPBOOT, an enhancement of the Disk Operating System for Myarc's Geneve 9640, reflects the first third-party software enhancement for the Geneve.

Coffey says JUMPBOOT will contain the latest version of SYSTEM/SYS, on a disk specially formatted to take advantage of the advanced fast multiple-sector read routines of the Geneve.

The remainder of the boot disk uses a more conventional format for efficient file I/O operations, he says. Coffey says that with this program, during boot up a disk can be read at 45 sectors per second using a TI or CorComp controller and at 80 sectors per second using a Myarc controller.

The current (256-sector) verson of SYSTEM/SYS, the Geneve operating system, takes about half a minute to boot up in the form distributed by Myarc, while the nominal times for the same file from the JUMPBOOT disks are seven seconds for TI or CorComp controllers and four seconds for the Myarc controller, he says. The 160Kbit/sec data transfer rate achieved by the new disk is near the physical limit for standard 5¼-inch drives, he says.

Later versions of SYSTEM/SYS can be written over the old version without losing the fast loading capability, as long as the disk is not reformatted, he says. Upgrades will probably be distributed via telecommunications resources such as the CompuServe TI Forum and the Delphi TI Information Network, Coffey notes. He says larger versions of SYSTEM/SYS and MDOS can be installed by removing the filler file from the specially formatted sector of the disk.

Guide and Coffey said they wanted to express gratitude to Myarc for its openness in distributing its copyrighted operating system software to enable development of third-party enhancements.

Coffey says he selects disks for dimensional accuracy and jacket stability and tests them for resistance to chatter during high-speed reads. Disks that fail to perform may be returned for a replacement as long as the original format has not been altered or the disk damaged. Coffey notes that because of special formatting techniques the disk cannot be routinely backed up by normal methods. Therefore, he recommends a backup disk with the boot disks. Two duplicate disks are available for $25.95 and single disks are available for $15.95. Shipping and handling is $2 and Virginia residents add 5 percent sales tax. DOS accepts American Express, MasterCard and Visa.

Guide says DOS is looking for Myarc dealers who can technically support their customers and maintain a small returnable inventory. A telecommunications address for dealers would be an asset, he says.

Disk Only Software has new telephone numbers, according to Guide.

The numbers are 1-800-456-9272 for orders only and (703) 339-7097 for help and information.

He says the company will now have one central distribution point instead of two, and says that all mail for the company should be sent to P.O. Box 244, Lorton, VA 22079.

New BBS on line

Chris George of Gresham, Oregon, announces his new bulletin board. The board, the Net-Work 99 BBS, runs from 10 a.m. to 10 p.m. Pacific Time at 300/1200 baud.

He says it has many downloads and some adventure games and can be accessed with PC Pursuit. Phone number for the board is (503) 667-4992.

Exhibitors listed for Chicago event

Lou Phillips of Myarc Inc. is scheduled to demonstrate the Geneve 9640 at the Chicago TI-Faire Nov. 7.

Another seminar will be conducted by Dave Wakely of the Chicago Users Group, sponsor of the TI-Faire, on Triton's Turbo-XT.

The fifth annual TI-Faire will be held from 9 a.m. to 6 p.m. Nov. 7 in the Ironwood Room at Triton College in River Grove, Illinois.

Exhibitors who will demonstrate products include Asgard Software, Boston Computer Society, Bud Mills Services, Bytemaster Computer, Chicago B128 Users' Group, B & D Computer Supplies, C and G Drives, Channel 99 Users' Group, Competition Computer Products, Compuserve/TI-Forum, Corporate Disk Company, Data System and Disk Movers.

Also, Great Lakes Software, Horizon Computer Limited, Hunter Electronics, L.L. Conner Enterprise, Myarc Inc., Rave 99 Co., Ryte Data, T.A.P.E. (Mechatronics), Tomputer Software, Service Solutions Inc., Will County Users' Group and Corporate Disk Company.

The Chicago Faire is being held in conjunction with the Milwaukee Users' Group and the Wisconsin TI Council, which will be held in Milwaukee, Wisconsin, Nov. 8.

For further information, contact Marcy Brun 9 a.m.-9 p.m. CST at (312) 348-0108.

Games featured on TI-Keep BBS

The TI-Keep BBS, running on TI-NET software, operates 24 hours a day, seven days a week at 300/1200 baud in Newbury Park, California, according to Greg McGill, sysop.

McGill says the board has Xmodem downloads available online for the and nine message bases, including a role-playing game and a never-ending story.

McGill says he has modified most of the adventures, games and other programs for the Techie BBS to run on TI-NET, making a total of nine games on that part of the board in addition to the original gameroom and casino. Included in the games are Golf, Battleship, text adventures and a biorhythm chart. The board is operated under the theme of a medieval keep or castle.

"Unfortunately we are not available in PC-Pursuit, but it's worth the toll charges," McGill says.

Number for the board is (805) 499-5415.

Australian developing TI to MS-DOS system

Tony McGovern of Kotara, New South

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Newsbytes

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Wales, Australia, reports that a MS-DOS system for the TI is under development there.

McGovern wrote in response to an inquiry from MICROpendium.

He says the program is entirely the work of his son, Will McGovern, who is in his last year of high school, and for that reason it may not be out until the end of the year.

"The actual file transfer code is not quite finished yet — mainly the final details of sector blocking for the TI to MS-DOS direction," the elder McGovern writes. "The MS-DOS disk handling code itself is pretty polished now. The program automatically senses whether it has a TI or MS-DOS disk and catalogs appropriately. It handles MS-DOS 3.2 subdirectories with ease, and can format MS-DOS disks.

"The program presently runs on a Myarc disk controller (and DSDD drives, naturally) The disk access code itself has been kept completely modular, and porting to other controllers will be no more difficult than absolutely necessary. We can borrow a CorComp mini-box occasionally from the Hunter Valley 99 group so this will be easily catered for, but we cannot readily get hold of a CorComp PE-box disk card for development purposes. (Will McGovern's) earlier Disk-hacker program runs on the mini-box but not the PE box card for this same reason.

"Yes — the TI99/4A is a very tolerant machine, and doesn't object to having MS-DOS 3.2 directories on its screen at all."

McGovern says that the next edition of Funnelweb (formerly Funlwriter), v. 4.0, will be fully compatible with Myarc XBII. He says all changes since Funnelweb v. 3.4 will be incorporated in the new version, whose number has been updated because of the need for some changes to the externally defined reference block. He says he is working on the final item for it, a CONFIG program to eliminate any need for programming, even in XBASIC.

Funnelweb is available through the HV 99ers, 6 Arcot Close, Tarro, NSW, Australia 2322.

Proto-typing board developed by users

A new Proto-typing board for the peripheral expansion box has been announced by Scott Coleman and John Willforth.

Willforth says the board also incorporates a general purpose project carrier for the PEB.

The board can be used in the 99/4A, 99/8 and Geneve 9640 environments, the manufacturers say.

They list the following features:

- For the 99/4A, all the standard address, data and control are brought up through the recommended 74LS244, 74LS245 and either a 74LS125 or chip of the users choice, to be interfaced to the circuit. The board will support both solder tail and wire-wrap.
- For the 99/8, the three additional address lines are brought up on board.
- For the Geneve, the unused address and control lines are brought up on board.
- The board has columns identified by alpha characters and rows identified by 10s.
- The board directly supports two voltage sources.
- Because of the large potential for the use of the 6264 and 62256 Low Power static RAMs, the board has two dedicated etched areas to enable easy development with this chip.
- Below the RAM area are three 16-pin chip locations for decoding and setting CRU addresses.

From 1 to 4 boards may be ordered at $35 each, and from 4 to 9 boards at $30 each. Shipping and handling is $3.50, with an added charge of $1.50 for Canadian and other foreign orders. Pennsylvania residents add 6 percent sales tax. Checks will not be cashed unless the board is ready for delivery, according to the manufacturer. All orders are payable in U.S. funds.

The boards may be ordered from Computer Bug, 5075 Clairton Blvd., Pittsburgh, PA 15236, (412) 882-3374. The manufacturer estimates that delivery will begin in mid-September. Quantity pricing is available. For further information, contact Willforth at R.D. #1, Box 73A, Jeannette, PA 15644 or (412) 527-6656.

Asgard to supply large-print manuals

Asgard Software has published a large-print manual for its game program, Legends. Users can purchase the manual for $4 on returning their warranty card or other proof of purchase.

Asgard plans to produce other large-type manuals for its major products, according to Chris Bobbitt of the company. He says Asgard is responding to customer requests in producing the manuals for persons with poor vision or who are partially sighted.

If demand warrants, Bobbitt says, manuals will be made available on cassette at a negotiable price for blind users.

For further information, or to order, contact Asgard Software, P.O. Box 10306, Rockville, MD 20850.

Spad XIII upgraded by Not-Polyoptics

Not-Polyoptics has announced an upgrade to Spad III, its machine-language flight simulator for the TI99/4A, scheduled for release Sept. 15.

According to Michael V. Capobianco of Not-Polyoptics, Spad XIII Mk. 2 is twice as fast as the previous version and more responsive.

New features have also been added, he says. In addition to the six "out of the cockpit" views, a removed viewpoint, showing the plane from an observer's standpoint, has been included.

"Better algorithms produce improved graphics and a more realistic flight performance," Capobianco says. "Keyboard/joystick interface has been augmented to allow new functions and greater flexibility. Finally, an optional 'Red Baron' Fokker tri-plane opponent provides even more exciting dogfights."

Spad XIII, MC. 2 requires a TI99/4A with Extended BASIC, 32K expansion memory and disk drive.

The program will retail for $29.95, according to the manufacturer. Registered purchasers of Spad XIII can obtain the upgrade by sending $6.95 plus $1 shipping and handling to Not-Polyoptics, P.O. Box 4443, Woolbridge, VA 22194.

Newsbytes is a column of general information about products and services relating to TI users. The publisher does not necessarily endorse products listed in this column. Vendors, manufacturers and others are encouraged to submit items for consideration. Photos will be used when space permits. Materials cannot be returned.

User Notes

Continuous time-keeping

Arthur Hazboun, of Harbor City, California, writes:

After purchasing CorComp's Triple Tech card, I was astonished to find that the "clock" in this card can't be displayed on the screen continuously. So, after playing around with the operations manual, I wrote this quick and short program that will display current date, time and day. The clock continues to tick away on the screen as long as the user wants. I am sure other programmers can modify this routine to include it in subprograms, electronic bulletin boards, etc. I call the program "OKCLOCK."

```
10 CALL CLEAR
20 REM TIME/DATE/DAY
30 OPEN #1:"CLOCK"
40 INPUT #1:A$,B$,C$
41 IF A$="0" THEN A$="SUNDAY
"
42 IF A$="1" THEN A$="MONDAY
"
43 IF A$="2" THEN A$="TUESDA
Y"
44 IF A$="3" THEN A$="WEDNES
DAY"
45 IF A$="4" THEN A$="THURSD
AY"
46 IF A$="5" THEN A$="FRIDAY
"
47 IF A$="6" THEN A$="SATURD
AY"
50 DISPLAY AT(10,1):C$;"    "
60 DISPLAY AT(12,1):B$;"    "
70 DISPLAY AT(14,1):A$;"    "
80 GOTO 40
```

Put commas in their place

Bob Keahey, of Albuquerque, New Mexico, has a subroutine that is used to place commas in their place when using large numbers. You know, 3000 becomes 3,000; 30000 becomes 30,000. And so on. He writes:

A while back I had a need to add commas to some values that were entered by the program. Some other computers allow you to do this with a PRINT USING statement, but I have not seen a way for the TI. I wrote this short subprogram to add commas where needed to any number up to 9999999999 (that's 9,999,999,999).

Lines 10 to 40 are simply for illustrative purposes. The subroutine may be resequenced to fit in with the main program that would call it. Saving the subroutine in MERGE format is a good idea, making it easy to insert it into the main program when required.

```
10 INPUT X
20 CALL NUMCOM(X,ANS$)
30 PRINT ANS$
40 GOTO 10
30000 SUB NUMCOM(X,ANS$)
30001 REM THIS SUB WILL ADD
COMMAS TO A NUMBER LESS THAN
 1.0 E+10
30002 REM CALL NUMCOM(X,ANS$
) TO USE ROUTINE
30003 REM VARIABLE X IS THE
NUMBER TO BE CONVERTED
30004 REM STRING ANS$ IS THE
 CONVERTED NUMBER
30005 REM SAVE IN MERGE FORM
AT
30006 X$=STR$(X)
30007 L=LEN(X$)
30008 IF X>=1.E+10 THEN ANS$
=X$ :: GOTO 30023
30009 L=L-3 :: IF L<=0 THEN
30012
30010 R=R+1
30011 GOTO 30009
30012 L=4+L
30013 FOR LP=0 TO R-1
30014 TP$(LP)=",&SEG$(X$,3*
LP+L,3)
30015 NEXT LP
30016 FOR LP=0 TO R
30017 TNS$=TNS$&TP$(LP)
30018 NEXT LP
30019 FOR LP=0 TO R
30020 TP$(LP)=""
30021 NEXT LP
30022 ANS$=SEG$(X$,1,L-1)&TN
S$
30023 TNS$="" :: R=0
30024 SUBEND
```

Help is here for GP-100TI owners

Boyd Shugert, of Portsmouth, Ohio, offers advice to those who use an Axiom GP-100TI printer (not the GP-100TI II). Many of the machines were sold were inadequate or inaccurate documentation, according to Shugert. He writes:

The manual that was shipped with my printer is for the GP-100A and is totally inadequate. For example, the manual states that CHR$(8) invokes the graphics mode. Not so! This may work with the 100A or the 100TI II, but it does nothing on my 100TI. Also, the manual says nothing about escape sequence codes.

Since I desired graphics capability, I experimented with the command codes to see what I could discover. I was pleasantly surprised to find not only the graphics capability that I wanted but also a variety of other features. These codes are presented in the following table:

ESCAPE SEQUENCE	ACTION
26;65	Invokes double-height printing (requires linefeed at the end of each line of text)
27;66	Invokes double-height/double-width printing (requires linefeed at the end of each line of text)
27;70;N	Sets formfeed to N lines
27;71;N1;N2	Sets graphic mode for printing of N graphic characters — N1INT(N/256) and N2 N-N1*256
27;76;N	Sets the number of 1/18 inch increments in the linefeed command (N2 for graphic mode and N3 for text mode)
27;83;N	Sets the number of 1/60 inch spaces between pica print characters

Escape sequences 27;71;N1;N2 is the code for graphics, but note that the N1 and N2 parameters are reversed as compared to most other printers.

Although the 100TI has only the pica print pitch, it does have two standard print fonts that the others don't. These are double- height and double-width.

Another escape sequence that I found useful is CHR$(27);CHR$(83);CHR$(N) which lets you increase the spacing between letters. I use this code to emulate the emphasized mode which the 100TI does not support. To see what I mean, try this

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User Notes

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little program:

```
100 REM EMPHASIZED PRINT EMU
LATION
110 A$=CHR$(27)&CHR$(83)&CHR
$(1)&CHR$(13)
120 B$=CHR$(27)&CHR$(83)&CHR
$(2)
130 OPEN #1:"PIO.LF"
140 CALL CLEAR
150 PRINT "PRESS Q TO QUIT"
160 INPUT "INPUT MESSAGE":MS
G$
170 IF MSG$="Q" THEN 210
180 PRINT #1:TAB(10);B$;MSG$
;A$
190 PRINT #1:TAB(9);B$;CHR$(
32);MSG$;A$;CHR$(10)
200 GOTO 140
210 CLOSE #1
220 END
```

The two remaining sequences, setting the number of lines in a formfeed and the amount of spacing in a linefeed, are pretty much standard on all printers.

Brrrr! How cold does it feel?

It's only September, but it won't be long before the weather turns cold and the windchill factor takes the place of summer comfort indices. Major John Dixon, who was stationed in Belgium when he wrote us, provides an Extended BASIC program that determines the wind-chill factor based temperature and wind velocity.

The program will output its data to Epson-compatible printers. Readers may modify the printer commands in lines 260 and 270 to work with other printers. CHR$(87);CHR$(1) turns on double-width characters and CHR$(87);CHR$(0) turns double-width characters off, defaulting to the printer's normal character set. CHR$(10) forces a linefeed.

Line 180, which is longer than the normal 140 character limit, may be input by entering the first 140 characters, pressing return and then FCTN 8 (REDO). Cursor to the end of the line and enter the remaining characters.

```
100 !*****************
110 !*               *
120 !*   WINDCHILL   *
130 !*    FACTOR     *
140 !*               *
150 !*****************
160 CALL SCREEN(3):: FOR X=0
 TO 14 :: CALL COLOR(X,2,3):
: NEXT X
170 DISPLAY AT(1,4)ERASE ALL
:"** WINDCHILL FACTOR **"
180 DISPLAY AT(5,1):"TEMPERA
TURE? {    } DEGS F" :: ACCEP
T AT(5,15)SIZE(3)BEEP VALIDA
TE(NUMERIC):T :: DISPLAY AT(
7,1):"WIND VELOCITY?{    } MP
H"
190 ACCEPT AT(7,16)SIZE(3)BE
EP VALIDATE(NUMERIC):V
200 IF V>3.99 THEN 210 :: V=
4
210 C=((10.45+(6.686112*SQR(
V))-(.447041*V))/22.034*(T-9
1.4))+91.4
220 DISPLAY AT(10,1):"WINDCH
ILL FACTOR:": :TAB(5);"***** "
;C;" ***"
230 DISPLAY AT(22,3):"PRINT
THIS OUT?      {N}" :: ACCEPT
 AT(22,24)SIZE(-1)BEEP VALID
ATE("YN"):ANS$ :: IF ANS$="Y
" THEN 250
240 DISPLAY AT(24,3):"ANOTHE
R CONVERSION? {Y}" :: ACCEPT
 AT(24,24)SIZE(-1)BEEP VALID
ATE("YN"):ANS$ :: IF ANS$="Y
" THEN 170 :: END
250 !PRINT SUBROUTINE
260 OPEN #1:"PIO" :: PRINT #
1:CHR$(27);CHR$(87);CHR$(1):
: PRINT #1:TAB(10);"** WINDC
HILL FACTOR **" :: PRINT #1:
CHR$(27);CHR$(87);CHR$(0)
270 PRINT #1:CHR$(10):TAB(25
);"TEMPERATURE  :";T;"DEGS F
AH" :: PRINT #1:TAB(25);"WIN
D VELOCITY: ";V;" MPH"
280 PRINT #1:TAB(25);"WINDCH
ILL FACTOR IS: ";C;" DEGREES
" :: CLOSE #1
290 GOTO 240
```

Sprite correction in TI-Forth

Thomas E. Sharp, of Mesa Arizona, writes:

I have been trying to learn Forth programming and recently moved into the graphics section (Chap. 6 of the TI-Forth manual). In attempting to use the sprite initiation word, SSDT, as defined on page 9 of Chap. 6, I got an error message — "stack empty."

On checking the definition of SSDT on screen 58 in Appendix I of the manual it seemed obvious — by tracking the stack effects, the stack would be empty when "300 ! SATR ! " are called near the end of the definition. But I had no idea of how to correct the error.

I belong to the Vast 99 Users Group (Valley of the Sun TI Users Group, Phoenix, Arizona). A member of the group, Rene LeBlanc, conducts a Forth tutorial in the group's newsletter. I talked to Rene about my sprite problem. He looked at the SSDT definition and told me to change " 300 ! SATR ! " to " 300 ' SATR ! " It works perfectly.

SXB—

(Continued from Page 34)

mands because a lot of these are going to be sold in short order.

The market is going to be flooded with old Version 110s. I wish there were some way the old cartridges could be updated more cheaply, but it isn't possible. I will say one thing: the ROMs are socketed, so there may be some updates available one of these days. In the meantime, thanks, Triton, thanks, MG. You guys sure know how to keep my interest in the TI.

Classified

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